ELECTRICAL REVIEW

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Handing Over

Central Electricity Board's Achievements

IN its Report for 1947, some particulars of which are given on page 473, the Central Electricity Board gives an account of its stewardship during not only the year in question but also the twenty-one years of its existence. Set up to improve the efficiency of electricity supply through the pooling of reserve plant in interconnected generating stations through the full utilization of the most economical units, the Board can justly claim to have fulfilled its mission.

Gift to the Nation

The grid is estimated to have secured an aggregate capital saving of £145 million. Setting against this the total cost of its construction (including frequency standardization), £72 million, and deducting amortization and accumulated surplus amounting to £37 million, the net saving is put at £110 million. Taking into account the concurrent lowering of prices to consumers, it is deduced that the nation has obtained the physical asset of the grid for less than nothing.

The high performance of certain stations in large industrial areas could doubtless have been obtained without the grid, but the benefit could not have been extended to consumers of less favourably situated undertakings or to electrified railways and isolated factories with demands too great to be met from local public supply networks. In addition the incentive provided by the grid to standardize frequency enormously facilitated the manufacture of consumers' apparatus at lower costs.

These aspects have been overshadowed perhaps by the indispensable, though uncovenanted, contribution of the grid to the country's war effort, but the point here is to indicate the success achieved in serving the original objects with a view to estimating their effects on future trends. That part of our duties has been made easier in the past by the full information presented in these annual reports and willingly supplemented by the Board's officers. This information has covered not only generation, but also the use of the grid as a "field laboratory" where manufacturers have been enabled to test under working conditions transformers of the largest three-phase capacity, various designs of high-voltage cable, heavy-duty switchgear and many examples of lighter engineering (including protective gear of unapproached accuracy) that have greatly aided the preparation of transmission schemes abroad.

First-class Team

Large-scale production has provided exceptional opportunities for the human element. Under the leadership, successively, of Sir Andrew Duncan, Sir Archibald Page, Mr. Harold Hobson and Sir Johnstone Wright, all gifted with a flair for choosing the right men for their jobs, a first-class team was got together. Even so, centralized control would not have produced the results obtained. Area managers, on whom much responsibility was devolved, freely acknowledged the indispensable assistance received from the technical consultative committees.

In addition to the assets, human and

material, which the C.E.B. will hand over next week to the new Central Authority, there are two unresolved problems. The Board still insists that its full generating plant programme is essential to avoid a serious handicap to industrial recovery. The consequences of its previous unheeded warnings about plant and fuel are with us to-day. The second is that the successful development of the policy of using low-grade coals for the generation of electricity depends upon a price structure that is related to heat content and to the additional costs incurred in burning these fuels.

E.D.A. Past and Future

WHILE naturally many regrets were expressed at last week's gathering of the Electrical Development Association there was also confidence in the future of the organization in some form, a confidence which was stimulated by Lord Citrine at the luncheon and Mr. H. F. Carpenter at the annual meeting. It was felt that the twelve-month breathing space would give the British Electricity Authority time to come to the conclusion that an electrical development body was a necessity. Hopes were expressed that many of the present E.D.A. stalwarts would be found in the reconstituted Council and the announcement that Mr. Carpenter would be a B.E.A. representative, together with Mr. J. Hacking, Col. E. H. Woodward, Mr. E. R. Wilkinson, Mr. G. A. Vowles and Mr. W. N. C. Clinch is a guarantee of continuity of purpose and policy.

Protecting the Consumer

AT the meeting of the Incorporated Municipal Electrical Association on 18th March it was made clear that legal and other difficulties prevented the continuance of the Association and a resolution was passed formally winding up the organization. The following day the Committee of Smaller Municipal Electricity Undertakings, which is not precluded by similar legal considerations from continuing to function, discussed a proposal that it should not be dissolved for at least a year and that in the meantime a sub-committee should hold a watching brief in case the process of nationalization should reveal the necessity for a body to protect and promote the interests of electricity consumers, particularly local authorities. Consideration of the matter was deferred until the Eastbourne Convention in June.

Compound Migration

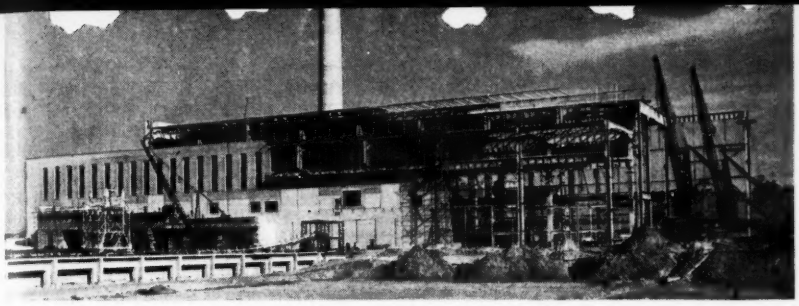
THEORIES as to the causes of compound migration have proved inadequate to account for all its manifestations. Differences in gradient and oil temperatures do not. The conclusions reached by Messrs. C. J. Armstrong and C. T. W. Sutton, set out in their recent I.E.E. paper, that the high vacua attained in modern solid cables is responsible may not cover every kind of trouble experienced, but the supporting data, derived from examination of defective joints and sealing ends after lengthy service, are impressive. The principles of design for accessories that they suggest follow logically from the conditions they have observed. Their general applicability seems a fit subject for further early investigation.

B.E.A. GUIDE

In response to an insistent demand we have produced a provisional guide to the new electricity organization, completed up to the time of printing. It will be available next week and will give particulars of the British Electricity Authority, the Area Boards and the Generation Divisions with brief biographical notes on the personnel. The handbook may be obtained from booksellers or direct from the Electrical Review, Dorset House, Stamford St., S.E.1, at 2s. per copy (postage 2d.)

International Consultation

AT the present stage of active development of large electrical systems with the trend towards the use of higher voltages, opportunities for exchange of experience between engineers of different nationalities are likely to become of increasing value. A realization of this is shown by the steadily increasing membership of the C.I.G.R.E., which is holding its second post-war conference in Paris next June. From the provisional technical programme referred to on page 475 of this issue, the conference promises to yield as good results as did its predecessor two years earlier.



Constructional Features of the New Ipswich Station

Cliff Quay

THE new Cliff Quay power station of the Ipswich Corporation Electricity Department has now arrived at a suitable stage in its construction for the presentation of a preliminary and essentially constructional illustrated description. When completed the station will have a capacity of 270 MW, made up of six Metropolitan-Vickers 45-MW turbo-alternators served by nine Babcock & Wilcox 365,000-lb (166,000 kg) per hour pulverized-fuel-fired boilers, with steam conditions of 635 lb per sq in (44 kg per sq cm) and 850 deg F (454 deg C).

The steel structure of the main buildings is practically complete, and the walls, floors and roofs are almost finished at the west end of the station where work is being concentrated on the first two turbo-alternator sets and on the first few boilers. The tubing for the first two boilers, including the combustion-chamber walls, the circulation system, the superheaters, the economizers and the air heaters has been erected, and the lower halves of the h.p. and l.p. sections of the first turbine are in position and equipped with their blading and rotors.

Cliff Quay power station is situated nearly two miles south of the centre of Ipswich, on the north-east bank of the River Orwell, at a point where the course of the river is north-west to south-east. For the simplification of this description, however, we shall refer to the station as having its " south " side facing the river and the main railway line to London on the other side of the river.

The station site is roughly rectangular and has a total area of 104 acres (42·2 hectares), including 17 acres (6·9 hectares) of reclaimed land at the river bank and 40 acres (16·2 hectares) of water area which is to be filled in later as part of the ash-disposal scheme. The main building block presents a frontage of about 800 ft (244 metres) to the river, near the original high-water line, and from points on the river bank roughly 100 ft (30·5 metres) east of the east end of the block and 100 ft west of the west end of the block coffer dam walls project out into the river—about 425 ft (29·8 metres) at the west end and 800 ft (244 metres) at the east end—to meet another coffer wall roughly in line with the river, enclosing an area of about 17 acres (6·9 hectares) for coal storage purposes.

From the " south-east " corner of this enclosure another coffer wall is being constructed, veering northerly towards the river bank, so as to provide the ash-disposal area referred to. At the east end of the frontal coffer wall is a reinforced-concrete jetty about 350 ft (106·8 metres) long, and at the east end this jetty adjoins a condensing water pump house, the jetty and the pump house making a total length of 500 ft (152·5 metres). The pump house will accommodate six Drysdale pumps at the minus 20 ft (6·1 metres) O.D. level, and the pump motors will be at the plus 14 ft (4·27 metres) O.D. level which is also the top level of the jetty and the level of the turbine- and boiler-house basements. The immediate ground level at the station buildings is 14 ft (4·27 metres) O.D., but it rises rather sharply away from the river within the site.

The jetty is erected on concrete cylinders lowered into the river bed, and the pump house, including screening and clear-water chambers, is a concrete structure within a " tank " of interlocked continuous steel piling. Brackett screens are provided for. Similar piling also constitutes the coffer

In our title picture is shown the main building which has a frontage of about 800 ft

walls—two lines in each case about 20 ft (6·1 metres) apart, with earth filling.

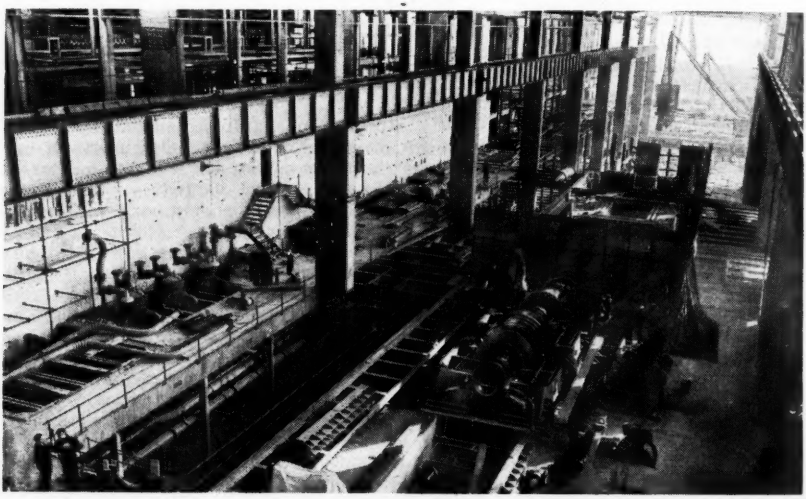
At about 150-ft (45·75-metre) centres two concrete tracks connect the roadway alongside the main buildings and the jetty, i.e., they run across the reclaimed land. These tracks are 640 ft (195 metres) and 700 ft (213·5 metres) (east) long, respectively, are constructed on concrete piles and have a top level of 14 ft (4·27 metres) O.D. They carry a reclaiming transporter bridge which spans the storage ground with a capacity of 42,000 tons and has a 75-ft (22·85-metre) overhang at either end. Along each track is also a conveyor which is served from a conveyor along the jetty which, in turn, is fed from three Stothert & Pittjetty cranes, each of which incorporates a receiving hopper and a feeder cross conveyor to the jetty conveyor.

The track conveyors, at the shore end, connect with others running first east, then north and finally west into the conveyor house over the boiler bunkers, by way of junction towers. All the conveyors from the transporter tracks to the boiler-house bunkers are housed in covered-in gantries. The coal-handling system is being installed by Robert Dempster & Sons, Ltd.

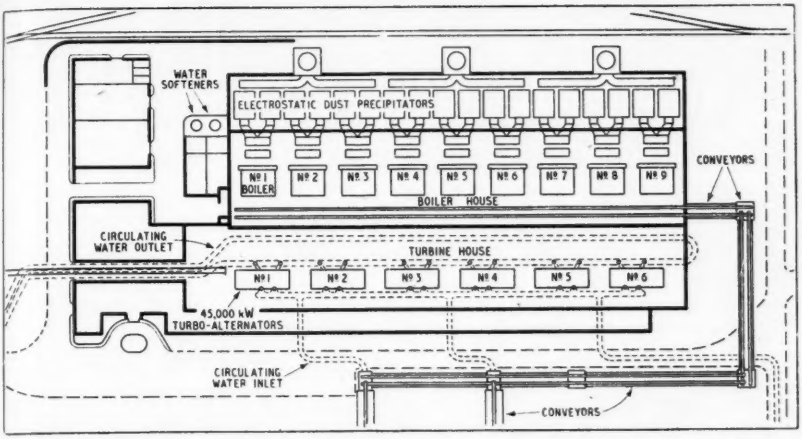
Under each transporter track, i.e., in the structure, is a rectangular concrete c.w. inlet culvert, and there is a similar culvert in the easternmost coffer wall. These three inlet culverts run from the pump house to a main feeder culvert under the turbine house on the south side of and parallel with the turbine line. Two c.w. outlet culverts similarly placed on the north side of the turbine line continue along the westernmost coffer wall, in the wall structure, to the c.w. outlet at the " south-west " corner of the reclaimed area.

The main block of buildings measures overall 770 ft (234·5 metres) long and 311 ft (94·8 metres) wide. The whole of the weight is carried by piled foundations. About 5,500 concrete piles, cast in situ, are employed, in addition to 700 pre-cast piles at the river works. The turbine house is 630 ft (192 metres) long and 113 ft (34·4 metres) wide, the width including a 25-ft (7·63-metre) transformer and switchgear annexe on the south side, and a feed pump bay 28 ft (8·54 metres) wide on the north side of the building proper. The turbine house is about 80 ft (24·4 metres) high above basement level (94 ft (28·65 metres) O.D.), and the actual turbine level (operating floor) is 44 ft (13·4 metres) O.D. The turbine room has a 95-ton Ransomes & Rapier crane.

Between the operating floor and the basement there is a floor at 26 ft (7·94 metres) O.D. on which are placed the Weir evaporators and feed heaters. The latter rise



The turbo-alternators are to be aligned down the centre of the turbine room ; feed-pump bay left

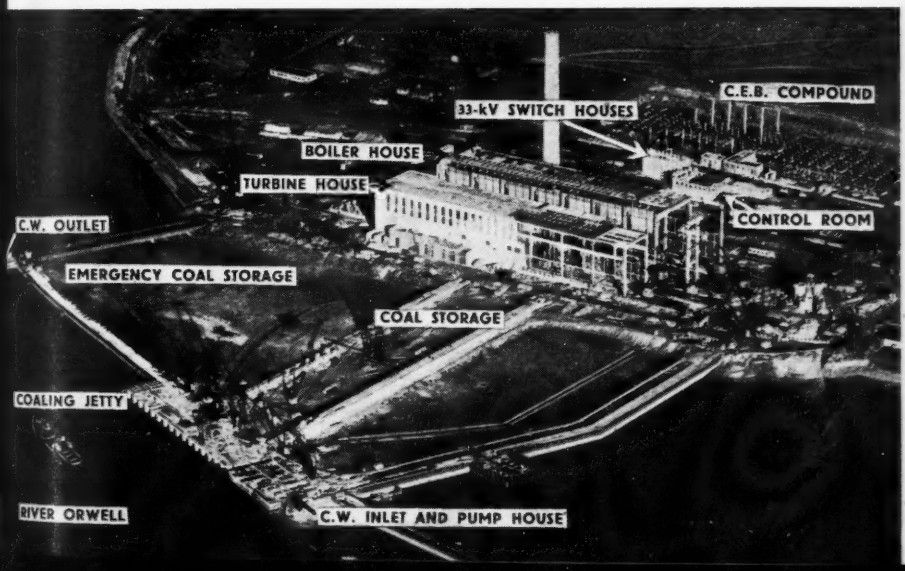


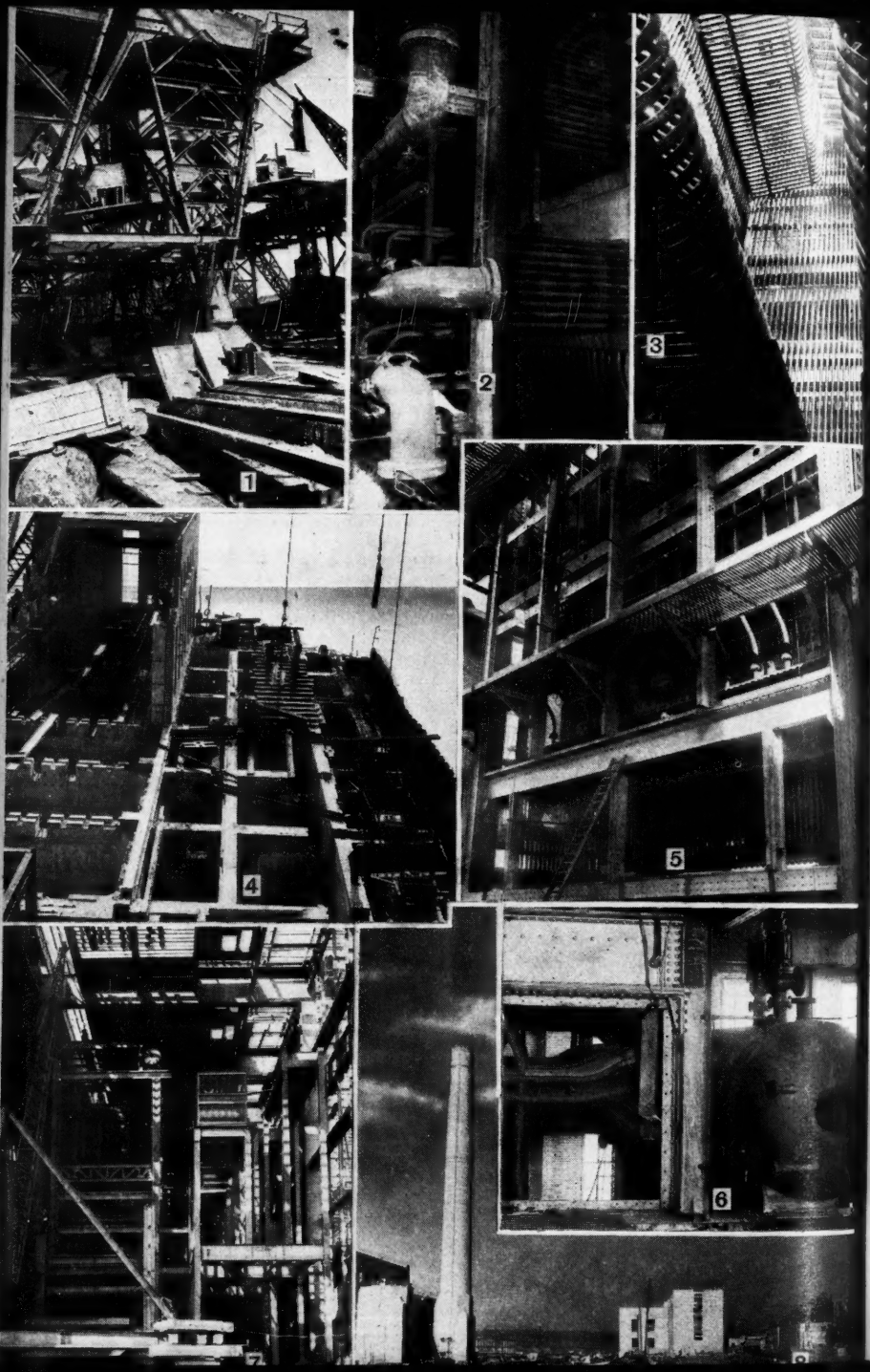
Cliff Quay power station is located nearly two miles south of the centre of Ipswich ; the 104-acre site is roughly rectangular and the main building block presents a frontage of about 800 ft to the river

above the operating floor level where they are aligned with the feed pumps. The six turbo-alternators are in line down the centre of the turbine room. At the west end of the turbine house is a loading bay into which a railway siding runs centrally, and there is a half loading bay at the east end. Adjoining the west end of the turbine house there are an office block and stores block, and these blocks bridge over the railway siding.

The first or southernmost 27 ft (8·24 metres) of width of the boiler house structure is the coal bunker bay; to the north is the boiler room which is 73 ft (22 metres) wide and rises to a height of about 100 ft (30·5 metres) above basement level (114 ft (34·8 metres) O.D.). From front (bunker bay) to back the boiler room measures about 32 ft (9·77 metres), and the remaining 41 ft is taken up by a U-shaped flue structure incorporating the primary and secondary air heaters and the low-temperature section of the economizers (forced flow).

The nine boilers are arranged in a single line with their fronts facing south, i.e., the turbine house. Between the basement and the roof there are galleries at nine levels.

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The combustion chamber extends from about the 25-ft (7·6-metre) level to about the 86-ft (26·2-metre) level where one finds the bottom tubes of the water-circulation system. At the boiler front the top dozen feet or so of the combustion chamber is recessed, and at the bottom of this recess are the p.f. burners. The boiler drum is at about the 196-ft (59-metre) level behind the boiler, and baffles rise from near the bottom circulation tubes to about the drum level. In front of the baffles are the two superheater sections, and at the back of the baffles is the high-temperature economizer or forced-flow section. In the bunker bay the 27 (three per boiler) p.f. mills are aligned at the basement level, the valve operating floor is at the 35-ft (11-metre) level, and the bunkers rise from the 86-ft (26-metre) level to the roof. The conveyor house is above roof level.

Also on the roof at the back of the boiler house are the forced draught fans, as well as a central line of river-water and softened-water tanks. The intakes for the fans are inside the boiler house a few feet above the boiler drums. The fan circuit is down to the back leg of the U flue trunk, in which leg is the vertical-tube secondary air heater. In the front leg at the top is the primary air heater, under which is the high-temperature section of the economizer (forced flow). Primary air fans are situated alongside the back leg of the U-shape air-trunk system slightly above the 53-ft (16-metre) level. The ash hopper under the central bottom mouth of the combustion chamber serves a sluice handling system which carries the ash into that portion of the river dammed for ash disposal. Aiton pipework is installed throughout.

An annexe on the north side of the boiler house houses eighteen Lodge-Cotterell electrostatic dust precipitators, two per boiler. The precipitator structure rises to a top level of about 90 ft (27·4 metres) O.D. The precipitators connect with the secondary air heaters at the top front and with the induced-draught fans at the back bottom, the fans being situated at a basement level of 16 ft (4·9 metres) O.D., i.e., 2 ft above the boiler- and turbine-house basements. Immediately behind the precipitators are three flue sections in line, i.e., three per boiler, each leading to a separate chimney. The chimneys, the westernmost of which is near completion, rise to 326 ft (99·5 metres) O.D. At the bottom the structure is 32 ft (9·8 metres) square and the inside diameter at the top is about 19 ft (5·8 metres).

About 250 ft (76·3 metres) north of the boiler house is a C.E.B. 132-kV substation under construction. This measures about 590 ft (180 metres) long, " east " to " west," and about 215 ft (65·6 metres) wide. It houses 132-kV, 2,500-MVA air-blast Metrovick switchgear which is tied to the 11·8-kV alternators through step-up Ferranti transformers.

Early construction work is now proceeding for two river crossings, the initial stages for 132-kV outgoing lines from this substation. The substation also accommodates three 132-kV/33-kV transformers by which local supplies are given to the Ipswich undertaking through two 33-kV switch-houses between the 132-kV substation and the power station. These 33-kV switch-houses form east and west flanks to a central control room for the station. The 33-kV switchgear has a rupturing capacity of 750 MVA. Between the switch-house and control-room building block and the power station are a number of sidings from Ipswich railway station.

All the auxiliary motors in the power station—3 kV and 400 V—are served by English Electric air-break switchgear. Pirelli-General 132-kV and 33-kV cables are installed. Other cables are by British Insulated Callender's Cables, Ltd.

The consulting engineers for the design and construction of the station are Merz & McLellan, for whom Sir Alexander Gibb & Partners are acting for the civil engineering works, and Farmer & Dark are the consulting architects. Charles Brand & Co. are contractors for the preliminary road and rail access, Edmund Nuttall, Sons & Co., Ltd., for the riverworks, foundations and buildings, and the Cleveland Bridge & Engineering Co., Ltd., for the steel-frame buildings. We are indebted to Mr. G. A. Vowles, the chief engineer, for permission to visit the station.

(See facing page): (1) Each jetty crane incorporates a feeding hopper and a cross conveyor to the jetty conveyor. (2) Superheater sections just above the 52-ft (15·8-metre) level. (3) The combustion chamber extends from the 25-ft (7·62-metre) level to the 86-ft (26·2-metre) O.D. level. (4) C.W. pump house, with screening chambers. (5) Combustion chamber recessed where the p.f. burners are situated. (6) Boiler drums are at about the 96-ft (29·25 metres) level. (7) From the bunker bay (left) the boiler proper rises about 32 ft (9·76 metres) to the U structure (right) housing the air heaters and l.t. economizer section. (8) Two 33-kV switch-houses for local supplies

Views on the News

Reflections on Current Topics

MANY old friends in new guises are now being seen at the electrical functions which the imminence of " vesting day " has engendered: borough electrical engineers who have become chairmen or deputy-chairmen of Electricity Boards or sub-area managers ; company directors and engineers who have been similarly translated ; and Central Board men who now bear the proud title of Divisional Controllers. It seems to me that the more the electricity supply 'industry changes the more it is the same thing. And that is a guarantee of continuance of the policy which has made the industry what it is.

* * *

Not all company chairmen are apprehensive of possible effects of the change of ownership of the industry. Speaking to one of the most prominent men in this sphere at the Electricity Supply Joint Committee luncheon, I found him quite unembittered. He seemed to be pleased generally with the new " set-up " and thought that there was no reason to fear for the industry's future.

* * *

Everybody at last week's E.D.A. luncheon admired Lord Citrine's obvious grasp of conditions in the electricity supply industry and appreciated his sympathetic handling of affairs, but still shared Lord Brabazon's regret that he was unable to be present. The recording of Lord Brabazon's speech was a good second-best to his actual presence but all missed the good-humoured exchanges which would undoubtedly have passed between him and Lord Citrine. Characteristic of Lord Brabazon's style were his insistence that his knee injury was not caused by bending it to anybody and his suggestion that the gas industry should be paying for E.D.A's current advertising.

* * *

Mr. Norman Elliott, chairman of the South-Eastern Electricity Board, has felt compelled to issue an explanation of the Board's acquisition of the Prince's Hotel, Hove, for its headquarters and the explanation was a reasonable one. But it has not satisfied Mr. W. Teeling, the member for Brighton, who, in a letter to *The Times* laments the taking-over of Hove's " best and most famous hotel." This is followed by the cryptic question: " Is not this like going to a steel-works area and purchasing a factory needed for the export market? " Mr. Teeling says that " over 200 new board officials and their families will have to be housed in an area in dire need of local accommodation; and in addition the accommodation for the tourist trade of the borough will be cut by that number as well." The acquisition of the 200 permanently-resident families will be of greater value to the borough than a succession of summer-time visitors, but I can sympathize with his local point of view. Actually, of course, the *general* housing situation will not be affected. I also sympathize with the immigrants in their search for houses.

* * *

Lt. Col. A. E. Knights, D.S.O., M.C., M.M., T.D., manager, No. 4 Sub-area, Eastern Electricity Board, late of the East Anglian Electric Supply Co., Ltd., has sent me a copy of *The Britannia*, the journal of the Royal Norfolk Regiment, in which he gives an account of the Fourth Battalion's life in a P.O.W. camp. Part of the camp had evidently been an electrical repair shop and stores and there was a large dump of all kinds of electrical accessories. About three weeks after the camp was occupied the Senior Medical Officer reported that he had discovered a small white building which was locked but obviously had something inside which " hummed." On investigation it was discovered that the hum emanated from a power transformer which was still being fed on the high-voltage side from the Singapore mains.

* * *

Accordingly a camp technical squap was formed, cables were traced, faults repaired, huts wired and new cables from the store were laid where necessary. The substation was repaired and put into commission and soon electricity was available to every hut. " In fact," says Lt. Col. Knights, " it was the most cheap and abundant supply ever delivered to consumers; there were no installation charges and the price per unit was nothing." This hive of activity appears to have passed practically without comment by the Japanese guards, except for a request that their guard room should be lighted, and it was felt diplomatic to accede to this request.—**REFLECTOR.**

Electrical Development

Continuance of Association's Work

In the absence of the president (Lord Brabazon of Tara) through a knee operation Mr. H. F. CARPENTER, chairman of the Council, presided at last Friday's annual luncheon and meeting of the British Electrical Development Association at the Connaught Rooms, London.

Many distinguished guests were among the 700 present, including Lord Citrine (chairman of the British Electricity Authority), Mr. John Strachey (Minister of Food), Mr. L. Silkin (Minister of Town and Country Planning), Mr. Alfred Robens (Parliamentary Secretary, Ministry of Fuel and Power) and

1. Sir Johnstone Wright (*chairman, Central Electricity Board*), Sir Donald Fergusson (*secretary, Ministry of Fuel and Power*), Mr. E. W. Bussey (*British Electricity Authority*) and Mr. A. Robens (*Parliamentary Secretary, Ministry of Fuel and Power*). 2. Mr. L. Silkin (*Minister of Town and Country Planning*), Mr. V. W. Dale (*manager and secretary, E.D.A.*), Mrs. H. F. Carpenter and Mr. L. Gamage (*president, Institute of Export*). 3. The Dowager Lady Swaythling (*president, E.A.W.*), Sir Henry Self (*deputy-chairman, B.E.A.*), Mrs. J. Eccles and Lord Citrine (*chairman, B.E.A.*) 4. Mr. J. Hacking (*deputy-chairman, B.E.A.*), Alderman Sir William Walker (*past-president, E.D.A.*), Sir Archibald Rowlands (*secretary, Ministry of Supply*) and Mr. J. Eccles (*vice-chairman, E.D.A.*). 5. Mr. H. F. Carpenter, (*chairman, E.D.A. Council*), Sir John Kennedy (*chairman, Electricity Commission*) and Mr. John Strachey (*Minister of Food*)

Personalities at the E.D.A. Luncheon

maintaining the spirit which characterized the great electricity supply industry. With E.D.A.'s help that industry had made remarkable growth and had considerably raised the standard of life of the ordinary people.

What of the future? He had tried to allay the anxiety of those in the industry regarding their daily life and security. The appointments made by the new authorities showed that they had chosen experienced people and had thus ensured a minimum of disturbance. As to the future of E.D.A. they were avoiding any hasty steps. To give them time for proper consideration they had decided that the Association should carry on for a further twelve months and its income would be assured for that period. Naturally the constitution would be changed; the Council would comprise representatives of the B.E.A., the Area Boards and the Generating Divisions.

The present chairman, Mr. H. F. Carpenter, would be one of the B.E.A.'s representatives with Mr. J. Hacking, Col. E. H. Woodward, Mr. E. R. Wilkinson, Mr. G. A. Vowles and Mr. W. N. C. Clinch. He hoped that the representatives of many phases of public life.

LORD CITRINE proposed the toast of the Association and regretted the absence of Lord Brabazon, an old friend of his and a man who was free from cant and a desire for fleeting popularity. After paying a compliment to Mr. V. W. Dale, manager and secretary of E.D.A., as an unassuming and tireless worker, Lord Citrine said that in the circumstances he was presumably addressing "corpses"—but they were obviously much electrified corpses who were

Area Boards would also endeavour to maintain the continuity indicated by these names.

The speaker said that he believed in evolution—if it were rapid enough. He realized, however, that there was a limit to the speeding-up of evolution. Until 1938 E.D.A. had represented all sections of the electrical industry; then there had been a change but he thought it worth while considering whether the organization should not again represent all interests. In this connection he mentioned the possibility of an " all-in " convention.

It was tragic that the electricity supply industry should at present be so restricted, but it had to work within the framework of the national economy. There would be a scarcity of electricity for years to come unless there were developed generation means not yet visible.

The Association had done much to educate the people against waste. At present only 45 per cent of the generating plant was in full use for twenty-four hours a day and he welcomed the setting-up of the committee to study means of limiting and spreading the domestic load. They had to concentrate on increasing the industrial demand; there would be enormous savings from the electrification of textile mills and collieries.

There was much to be done yet and E.D.A. would continue to be a useful instrument for this purpose. Referring to Silvanus Thompson's " Electricity in the Service of Man," he considered that this should be the B.E.A.'s motto. He asked those present not to look upon him as a usurper but as one who wished to serve the industry to the best of his ability.

Mr. Dale's Reply

The response to the toast was made by MR. V. W. DALE who, referring to the assistance which the Association had given the new Authority, said that it was merely the same service as that which E.D.A. had given to the public for twenty-nine years. He wanted to convince people who were not so convinced as Lord Citrine of the value of E.D.A.'s work during half the lifetime of the electricity supply industry. In the drafting of the 1947 Act the Association had been completely overlooked although it was firmly established in the industry's affections.

The Association was not interested in ownership; within it there had been complete harmony between companies and municipalities who were concerned together in securing the best service to the consumer. For nine years they had been " in reverse "—urging the use of less electricity. The Association had been one of the first to assist the Ministry of Food in its campaigns and later it had fully co-operated with the Ministry of Fuel and Power.

They wanted to continue as an Association but they realized that they would be tested by their attitude towards the national economy. He did not think that the British Electricity Authority would throw away the goodwill which E.D.A. had built up.

In conclusion Mr. Dale paid a tribute to the former directors of the Association—the late Mr. Beauchamp (the founder) and Col. W. A. Vignoles and Mr. A. C. Cramb who were both present.

Lord Brabazon's Recorded Speech

There followed a reproduction of a speech recorded at his nursing home by Lord Brabazon who explained that he was laid up for repairs to his knee—an injury not caused by bending it to anyone. Referring to Lord Citrine as the new " super-dynamo," Lord Brabazon said that it was a solemn thought that the efforts of so many over so many years were ended and that the industry had been handed over to one vast authority. But if the industry was to be placed in anybody else's hands there could not have been a better choice than Lord Citrine.

No other industry in the world had shown steadily decreasing prices in the face of rising costs. There were still remarkable opportunities before the industry. By its intense work E.D.A. " had almost ruined the country " and had been forced to " back-pedal " and urge economy in the use of electricity. Lord Brabazon thought that the gas industry should be paying for the present advertisements. Co-ordination had been mentioned; that might mean that the gas people would get the coal and the electricity supply industry the slate.

They would understand him when he said that he could not continue as president under the new arrangements. He was proud to have held that office for five years and he wished the new authorities good luck.

Annual Meeting

At the subsequent annual meeting, at which Mr. Carpenter presided, the accounts were presented by MR. H. J. RANDALL who pointed out that the surplus was greater than in 1946. Advertising expenditure was down but films and exhibitions had cost more.

MR. F. NEWEY seconded the motion for the adoption of the accounts which was passed.

The chairman reported the appointment of Dame Caroline Haslett, D.B.E., as a vice-president and the reappointment as vice-presidents of Lord Beveridge and Capt. J. M. Donaldson.

Moving the adoption of the report for 1947, MR. CARPENTER referred with regret to the deaths of Lord Lytton, Mr. R. P. Sloan, Sir Leonard Pearce, Col. S. E. Monkhouse and Mr. J. W. Beauchamp to all of whom the Association was much indebted. He praised Mr. Dale's work in securing relief from the Chancellor's purchase-tax proposals. Referring to the latest advertising campaign Mr. Carpenter said that they had engaged some of the best cartoonists who had produced excellent results. He congratulated the North-Western Area Committee for initiating the standard control unit idea and said that the report on colliery electrification should have a great influence.

It was the intention of the B.E.A. to preserve continuity of representation on the Council and he hoped that the Area Boards would follow the same course.

Mr. J. ECCLES (vice-chairman) seconded the adoption of the report and it was passed without discussion.

Mr. Carpenter proposed a vote of thanks to Lord Brabazon and said that it was proposed to convey to him the Association's appreciation of his activity on their behalf. The motion was seconded by ALDERMAN A. CRITCHLEY, in the absence of MR. E. E. HOADLEY.

Chairman's Activities

In moving a vote of thanks to Mr. Carpenter, Mr. Eccles said that during the past year their chairman had travelled thousands of miles in Canada, Australia and New Zealand on behalf of the Chartered Institute of Secretaries and he had had a most strenuous time. Then he had been persuaded to take the post of secretary to what would be the largest electrical organization in the world. His great charm and personality would be invaluable in reconciling different interests.

The vote was cordially passed after it had been seconded by MR. CLARENCE PARKER and in his response Mr. Carpenter mentioned the pride in membership of E.D.A. which he had found in the Dominions. He was glad to be continuing as a member of the Council and he hoped that the spirit which had dominated E.D.A. would be retained.

CAPT. J. M. DONALDSON proposed a vote of thanks to Mr. Dale and his staff and Mr. Dale replied.

The proceedings concluded with the usual vote of thanks to the chairman and members of all E.D.A. committees and the technical press, proposed by ALDERMAN GRIMWADE and seconded by ALDERMAN MRS. E. GREGORY.

Annual Report

INTRODUCING its report for the past year, the Council expresses the view that the electricity supply industry must continue to be served by a national publicity body and that it is not too early to plan the great work of electrical development which must precede and accompany the restoration of the nation's generating and distributing resources.

The Council's views were set out in a memorandum to the Chairman of the British Electricity Authority and subsequently the Council was informed that the B.E.A. had decided that the Association should continue on the present lines until the end of 1948. In the meantime the matter would be subject to review in the light of experience. Some modification of the constitution will be necessary after the vesting date. The Council foresees no difficulty in carrying out the Association's functions within the framework of a policy laid down by the Authority.

There was a net increase of two (to 436) in the membership; the Stirling and Neath Councils became members and the Macao Electric Lighting Co. and the Provincial Electriciteitsbedrijf van Noordholland became overseas contributors.

Editorial publicity aimed at maintaining the prestige of the industry and public confidence without unduly stimulating demand. The Association was successful in obtaining some purchase tax concessions and further representations are being made to the Chancellor of the Exchequer regarding electrical appliances. An emergency campaign was launched to bring the need for economy before the public.

The first four of a series of ten-minute films, primarily for use in schools, were completed and the production of four others was begun. The film "Can We Be Rich?" was shown in over sixty cinemas and a shortened version was widely circulated to factories and other establishments. The C.E.B. film "Prelude to Prosperity" is also being distributed by the Association. Scripts of two rural films were approved.

E.D.A. took part in a number of exhibitions during the year and exhibits were arranged at the leading agricultural shows.

Close contact was maintained with all Government Departments in matters affecting electricity supply. Negotiations with the Ministry of Supply resulted in the securing of increased supplies of materials for the manu-

facture of cookers and spare parts. The attention of the Ministry of Health was drawn to the need for raising the limit fixed for electrical installations in new houses and an assurance was secured that the Ministry wished to see the standards kept up so far as supplies of materials and cost permitted. Modifications to improve the efficiency of water heating installations in temporary houses were adopted by the Ministry of Works as the result of discussions.

Among the activities of the Domestic Installations and Appliances Committee was the formation of a sub-committee to deal with external control of consumers' demands. A committee was appointed to study the electrification of collieries and a report recommending that all collieries' power requirements should be supplied from the public mains was presented to the National Coal Board. Other matters dealt with were public lighting, rural electrification, electricity in schools, electric cooker production and atmospheric pollution.

Recommendations for the early establishment of a testing house were approved and since the end of the the year this has been accomplished.

Educational activities included sales management and demonstrators' conferences, the training of salesmen, assistance to schools and the equipment of domestic science training colleges; orders totalling £9,600 were placed during the year in respect of the last item. Close relations have been maintained with many other organizations including international bodies.

Summarized reports are included of the Area Committees' activities and those of the Electrical Vehicle Association and the E.A.W.

The income and expenditure account shows total receipts of £150,832 (against £146,270 for 1946) and expenditure amounting to £143,048 (against £144,933) leaving a balance of £7,784 (against £1,337).

Electricity Appointments

More Positions Filled

THE British Electricity Authority announces the following further appointments in the Generation Divisions:—

Southern Division.—*Secretary*, Mr. P. D. A. Oliver, F.C.I.S.

South-Western Division.—*Generation engineer (operation)*, Mr. P. L. Lutt; *generation engineer (construction)*, Mr. J. Irlam, A.M.I.E.E., A.M.I.Mech.E.; *system operation engineer*, Mr. L. B. Law, A.M.I.E.E.

East Midlands Division.—*Generation engineers (operation)*, Mr. S. Anderson and Mr. W. Warren, M.I.E.E., M.I.Mech.E.; *generation engineer (construction)*, Mr. W. Brown, M.I.E.E., A.M.Inst.C.E., A.M.I.Mech.E.

Midlands Division.—*Secretary*, Mr. H. Hooper, M.I.E.E.; *generation engineers (operation)*, Mr. A. R. Clague, M.Eng., A.M.I.E.E., A.M.I.Mech.E., and Mr. F. W. Skelcher, A.M.I.E.E.; *generation engineers (construction)*, Mr. A. E. Farmer, M.I.E.E., M.I.Mech.E., and Mr. F. E. Ames, A.M.I.Mech.E.; *technical engineer*, Mr. E. V. Hardaker, B.Sc., A.M.I.E.E.; *plant testing engineer*, Mr. C. H. Petford, A.M.I.Mech.E.

Mersey & North Wales Division.—*Secretary*, Mr. E. Butterworth.

South-East Scotland Division.—*Accountant*, Mr. J. Cockburn, A.C.W.A.

South-West Scotland Division.—*Secretary*, Mr. A. Christianson, A.I.I.A.; *accountant*, Mr. J. F. Prickett, A.I.C.A.; *chief generation engineer (operation)*, Mr. W. McFarlane, B.Sc., A.M.I.E.E.

The **South East Scotland Electricity Board** announces the following appointments:—*Chief accountant*, Mr. Eric Maxwell, F.I.M.T.A. (town chamberland, Kirkcaldy; hon. secretary, Scottish Branch, Institute of Municipal Treasurers); *chief commercial officer*, Mr. J. W. Moule, B.Sc., A.M.I.C.E. (C.E.B.); *purchasing officer*, Mr. E. W. W. Churchward, A.M.I.E.E. (Edinburgh branch manager and technical engineer, English Electric Co.). *Sub-area managers:* Edinburgh sub-area, Mr. G. T. Allcock, B.Sc., A.M.I.C.E., A.M.I.E.E. (engineer and manager, Great Yarmouth Electricity Dept.); Stirling, Falkirk and Clackmannan sub-area, Mr. A. W. Andrews (manager, Scottish Central Electric Power Co. and Scottish Midlands Electricity Supply); Fife sub-area, Mr. C. H. A. Collyns, M.I.E.E. (general manager, Lothians Electric Power Co. and the Musselburgh & District Electric Light & Traction Co.); Lothians sub-area, Mr. F. G. Moore, B.Sc., M.I.E.E. (engineer and manager, Keighley Electricity Dept.); Southern sub-area, Mr. G. H. Sankey, B.Sc., A.M.I.E.E. (manager, Scottish Southern Electric Supply Co.).

South Eastern Electricity Board.—*Deputy sub-area managers:* Northern sub-area, Mr. H. Lowe, A.M.I.E.E. (County of London E.S. Co.); Eastern sub-area, Mr. C. Cameron Kirby, M.Inst.C.E., M.I.E.E., A.M.I.Mech.E. (Margate, Broadstairs and District Elec. Board). *Sub-area senior officers:* Engineering, Mr. J. R. T. Angier, A.M.I.Mech.E., A.M.I.E.E. (County of London Co.), Mr. J. H. Blackmore, Associate I.E.E. (Kent E.P. Co.) and Mr. G. R. A. Carr, A.M.I.E.E. (Brighton). *Section heads:* Engineering, Mr. H. M. Coggill (Yorkshire E.P. Co.) and Mr. L. H. Fuller, B.Sc., M.I.E.E. (Y.E.P. Co.). Commercial, Mr. T. S. Batey (Y.E.P. Co.), Mr. R. E. Gamlen, Associate I.E.E. (Mid-Cumberland Elec. Co.), Mr. C. A. Hayes (Y.E.P. Co.) and Mr I. M. Mackay, B.Sc., A.M.Inst.C.E. (Y.E.P. Co.).

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT the annual general meeting of the Institute of Export on 10th March, **Mr. Leslie Gamage,** M.A., M.C., vice-chairman of the General Electric Co., was re-elected president for a further year.

Mr. **S. James,** M.I.E.E., who has been with Chamberlain & Hookham, Ltd., for thirty-eight years, the greater part of the time as chief engineer and designer, retired at the end of February. Mr. James is well-known to a wide circle in the electrical world, particularly in connection with his activities on Meter & Instrument Transformer Technical Committees, B.S.I. and B.E.A.M.A. His friends in the industry will be glad to hear that he hopes continue with these activities for the time being.

Mr. S. James

Sir **Arthur Smout,** J.P., who has been elected president of the Institute of Metals, is a director of Imperial Chemical Industries, Ltd., and a number of other companies including Murex, Ltd., Murex Welding Processes, Ltd., and Pyrotenax, Ltd. He is chairman of the Non-Ferrous Metals Industry Standards Committee of the British Standards Institution, vice-president of the Institution of Mining and Metallurgy, and a member of Council of the British Non-Ferrous Metals Research Association, the British Welding Research Association, and the Copper Development Association.

The accompanying photograph was taken at a recent meeting of the London Section of the **Electrical Wholesalers' Federation,** which was addressed by the president, Mr. A. C. Baker (Simpson, Baker & Co., Ltd., Bristol). Besides Mr. Baker the group includes Mr. A. G. Beaver (Sun Electrical Co., Ltd., London), a founder member of the E.W.F.

Left to right: Messrs. W. Bensley, A. G. Beaver, E. C. Darby, A. C. Baker and A. B. Wildsmith (director)

Mr. H. H. Swift, B.E., M.I.E.E., who as briefly reported recently, has been appointed acting electrical engineer, Eastern & North Eastern Regions, Railway Executive, was educated at St. Peter's College, Adelaide, and Adelaide University. He was for a time with Siemens Schuckert in Berlin and subsequently joined the Dick Kerr Works of the English Electric Co. at Preston, going to Japan and South Africa in connection with electric traction contracts for the company. In 1930 he became chief assistant to the manager and chief engineer of the Traction Department of the English Electric Co. and in 1934 he was made assistant manager of the Department. In 1936 Mr. Swift joined the L.N.E.R. as assistant electrical engineer and has been chiefly engaged in the scheme work for the electrification of the lines between Manchester and Sheffield and from Liverpool Street Station to Shenfield. In 1941 he was appointed assistant chief electrical engineer when the department of the electrical engineer was separated from that of chief mechanical engineer.

Mr. R. P. Dean, formerly assistant export manager of Belling & Co., Ltd., has been appointed export manager to the company on the departure of **Mr. F. R. Robbins** to take up another appointment.

Mr. O. Bertoya and **Mr. W. S. C. Tully** have been appointed directors of the Renold & Coventry Chain Co., Ltd.

Air Chief Marshal Sir Roderic Hill has been appointed to succeed Sir Richard Southwell as Rector of the Imperial College of Science and Technology as from 1st October.

At a meeting of the Royal Society last week the following were among a number of men distinguished for their research work who were elected as Fellows:—**Dr. T. E. Allibone,** Director of the Research Laboratories of Associated Electrical Industries, Ltd. (contributions to the application of high-voltage phenomena); **Prof. O. R. Frisch,** Jacksonian Professor of Physics in the Cavendish Laboratory, Cambridge (researches on fission processes in nuclear physics); **Dr. W. A. H. Rushton,** University Lecturer in Physiology, Cambridge (researches on the effect of electrical

stimuli on muscles and nerves); and **Mr. J. W. Ryde**, senior physicist in the Research Laboratories of the General Electric Co., Ltd., Wembley (contributions to pure and applied physics).

Obituary

Mr. P. C. Croft.—We regret to record the death of Mr. P. C. Croft, assistant chief engineer to Brookhirst Switchgear, Ltd., which occurred suddenly at his home at Broughton, Chester, on 17th March. Mr. Croft was well known in the industry in connection with the solution of motor control problems.

Mr. E. F. Brackensey, sales representative of the Franco-British Electrical Co., Ltd., died suddenly on 15th March.

PARLIAMENTARY NEWS

By Our Special Reporter

REPLYING to Mr. Gallacher in the House of Commons last week Mr. Jack Jones (Parliamentary Secretary, Minister of Supply) said that the target for the building of new electrical generating plant capacity in 1948 for the Central Electricity Board was 1,150,000 kW, and for the North of Scotland Hydro Electric Board 20,100 kW.

Mr. Erroll asked the Minister of Fuel and Power whether, in view of the increasing difficulty in obtaining supplies of fuel oil at reasonable prices, he would instruct the British Electricity Authority not to proceed with the erection of any oil-fired power stations.

Mr. Gaitskell said it was not proposed to erect any public oil-fired generating stations, with the exception of Bankside where special conditions obtained.

In answer to Mr. Drayson, Mr. Gaitskell said that the first contract for digging out the foundations of the Poplar power station was placed on an all-risk basis. After work had begun, bomb damage was revealed which involved the carrying out of work at a cost higher than the total cost of the first contract. Accordingly, in order to cover this work, an addition was made to the original contract. It would be contrary to normal practice to disclose the financial details of these contracts in a Parliamentary answer, but he understood that the only payments made had been for completed and measured work.

Electricity Office Premises

Mr. Erroll asked the Minister of Fuel and Power if he would restrain the British Electricity Authority from acquiring large new office premises since the generation, supply and distribution of electricity throughout Great Britain had hitherto been satisfactorily organized by staffs within the existing office accommodation taken over with the other assets.

Mr. Gaitskell said he regarded the selection and purchase of accommodation as a matter wholly within the discretion of the Central Authority and the Area Boards.

Joint Use of Telephone Poles

Mr. Turton asked the Postmaster-General how far he had considered sharing G.P.O. telephone poles with the electricity suppliers in rural areas in the interests of timber economy and in order to speed up the supply of electricity and telephone services in these areas.

Mr. Paling replied that Post Office telephone poles were used jointly with electricity suppliers in rural areas in suitable cases. The possibility of extending the practice was recently carefully reviewed by Post Office engineers and the Electricity Commissioners, but the field for such extension was severely restricted by technical and safety considerations.

British Electricity Stock

Sir John Mellor asked the Chancellor of the Exchequer if he would give an assurance that the Treasury's estimate of the value of British Electricity Stock for purposes of compensation would, contrary to the precedent of British Transport Stock, be based upon arithmetical calculations.

Sir Stafford Cripps said he would not. The terms of British Electricity Stock would be decided in conformity with Sections 20 and 25 of the Electricity Act, 1947.

Electricity in East Africa

Replying to a question by Mr. Rankin, the Secretary of State for the Colonies (Mr. Creech Jones) said that the Governments of Kenya and Tanganyika decided not to accept the Westlake recommendations at present, chiefly because their technical and other resources were fully employed just now and already considerable development plans, taxing the administrations, were in progress. The size of the electricity undertaking in each territory was much greater than in Uganda and the cost of acquiring it and expanding it would also be greater. The decision did not in any way preclude the two Governments from taking steps to bring the electricity supply industry under public control at a more convenient time in the future.

Engineers and Agriculture

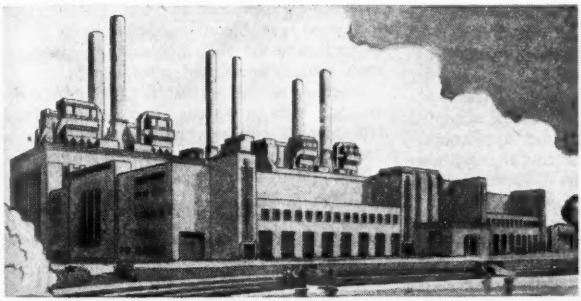
Mr. J. Baker White, M.P. for Canterbury, addressed a recent luncheon meeting of the Council of the British Engineers' Association on the subject of "Agriculture in the Engineering Industry." Mr. Keith Fraser (W. J. Fraser & Co., Ltd,), vice-president of the Association was in the chair.

North Wilford Power Station

Extensions Opened by Lord Citrine

NEW boiler and turbo-generator plant extensions at the Nottingham Corporation's North Wilford power station were formally inaugurated on 18th March by Lord Citrine, chairman of the British Electricity Authority. The extensions comprise two 30,000-kW turbo-alternators generating at 33 kV (one of which was set in motion last September and the other in February, 1947) and four 175,000-lb (79,380 kg) per hr pulverized fuel fired boilers operating at 625 lb per sq in and 860 deg F (43·94 kg per cm^2 and 460 deg C) compared with 600 lb per sq in. and 800 deg F (42·18 kg per cm^2 and 427 deg C) for the previous extensions. The new plant is intended to burn small Midlands coal with a calorific value of 9,500 B.Th.U. per lb (5,277 cal per kg) as fired, an ash content of 20 per cent, and with up to 18 per cent moisture.

This, the third stage of development, is being followed by a fourth stage which, when completed, will expand the total generating capacity of the station to 254,000 kW. The additional plant comprises two large turbo-generator sets and four boilers and is scheduled for completion during 1949. Rebuilding of the oldest section of the station will follow.



Artist's impression of the completed station

The proceedings began with a luncheon at the Nottingham Council House attended by the Lord Mayor (Councillor J. E. Mitchell), the Sheriff (Alderman W. Sharp), Lord Citrine, Alderman F. Mitchell (chairman of the Nottingham Electricity Committee), Councillor J. Willbery (vice-chairman of the Committee), Mr. M. Wadeson (city electrical engineer), and Mr. C. R. King (chairman), Mr. J. Mould (vice-chairman) and members of the East Midland Electricity Board.

In proposing the toast "The British Electricity Authority," Alderman F. Mitchell, who presided, spoke of the progress made by the undertaking during the past fifty years. In 1947, by good management of the engineer and the interest of the Committee, they were able to provide lighting at 3½d. and power at 1d. per unit. He hoped the Board, when it took over, would better those figures.

Responding, Lord Citrine said he well understood the civic pride in the undertaking and the regretting of its passing into the possession of the British Electricity Authority. What did the future hold? Certain broad principles were being followed, which would allay any misgivings. It was not so much a transfer to public ownership, because the industry was owned two-thirds by local authorities. It was the possibilities of co-ordination and the economies that should result. The functions of the Authority were confined to the generation and transmission of electricity. Distribution was to be looked after by the fourteen area boards, which would be responsible for day to day contact with the consumer. They would be in a position to employ the best brains and should be able to cut wasted time. They had a £450 million programme which they hoped to complete in 1952.

Referring to coal, Lord Citrine said the only way they could cover the higher cost was by increased thermal efficiency. The thermal efficiency for the whole country was only about 20 per cent. The North Wilford station would rise to 26 per cent, and if they could transform the old station to an overall efficiency of 26 per cent they would have no economic problem to worry them.

He mentioned that the East Midland Board was having a desperate search for accommodation. Mapperley Hall, Nottingham, might be suitable for them, and the Nottingham Corporation might be able, if it felt disposed, to help in this connection.

Following the luncheon, the guests numbering about 80, inspected the new extensions at North Wilford, where they saw Lord Citrine perform the opening ceremony.

The initial design and layout of the latest extensions were to the specification of Mr. G. H. Lake, M.I.E.E., and they have since been carried on by his successor, Mr. M. Wadeson, M.I.E.E., the present city electrical engineer. While the extensions have, in the main, followed the general design of those completed in 1936, there are several interesting developments

worthy of note. A system of boiler control that has lately gained a good deal of popularity has been successfully applied, for the first time in history, to boilers fired direct with pulverized fuel. There have been a few "teething troubles" but the equipment is settling down and all the indications are there to show that the choice has been a wise one.

Early in the deliberations following the direction to proceed with these extensions it became obvious that the existing control room would not lend itself to enlargement to what would ultimately be necessary for the completed station. The decision was therefore made to design a new control room embodying, in addition to the most modern practice put forward by the contractors, certain new ideas worked out by the engineers who had charge of the extensions. In the new control room main interest centres round the desk from which it is possible to control the operational cycle of the whole of the high-pressure boiler and turbine plant. Instructions for the running up or shutting down of plant can also be transmitted from the desk and a system of loudspeaking telephones is installed at all operation points. The control room design is based on an "all-round" arrangement of miniature panels which enables the control engineer to check, without leaving the desk, all outgoing feeder loadings, protection equipment indications and various other warning signals.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Price Control and Fair Trading

THE manufacturing and distributing sections of the electrical industry, as a result of close co-operation and much hard work spread over the last twenty-two years, have produced through the Electrical Fair Trading Council a complete and clear code of trading practice which forms the accepted basis for dealing with consumer appliances.

It was therefore disappointing that without any prior consultation, the Board of Trade issued the Miscellaneous Goods (Maximum Prices) Order, 1948, S.I. No. 348, the effect of which, owing to its many ambiguities, would have been to produce chaos in a well ordered and efficient distribution system. Fortunately the operation of the Order has been postponed *pro tem.* and it is hoped that before any further action is taken, some effort will be made to ascertain the problems of each industry and to make use of existing machinery wherever possible.

The Fair Trading Council will be found ready to assist the Board of Trade in any matters concerning the distribution of consumer appliances.

London, W.C.2. V. WATLINGTON,
Independent Chairman,
Electrical Fair Trading Council.

Position of Assistant Engineers

ABOUT 560 undertakings are covered by the 1947 Act, each of which employs a chief engineer or chief official. Each of the fourteen Area Boards has a chief engineer and a commercial head. In most cases there will also be a purchasing officer and a personnel superintendent, though the latter may not be appointed at once. This is a total of posts available at executive level of 56, or including the chairmen and deputy chairmen, already appointed, a total of 74.

Each Area will be sub-divided into about six or even sub-areas—say seven. These will have a sub-area manager with a sub-area engineer and a sub-area commercial officer. This is a total of 21, so far as engineering or managerial status goes. The total for all Boards will be 294. This represents a total for the country of all senior posts of about 368.

A reduction of about 5 per cent for immediate retirements, etc., shows that there will be at least 183 men who now enjoy the rank and status of chief engineer who will be redundant or who will suffer considerable loss both in status and salary. This is presupposing that all the above posts are filled by existing chief officials, which is known not to be the case. In fact, many of them are being filled by men who were not holding chief executive positions before. Therefore, a greater number of present chief officials than the figure of 183 will either be forced to accept considerably lowered status and salaries or to retire from the industry. In the case of sub-area senior officers the salary range of £750–£1,500 will mean a big drop in salary for some chief engineers who may feel obliged to accept these positions.

This bodes ill for the large majority of the less senior engineers as it is quite con-

ceivable that most of these "redundant" chief officials will endeavour to obtain posts of a less senior capacity in the hope that conditions will be improved. Therefore, the redundancy will fall instead on the great mass of deputies, chief assistants, mains superintendents and the like who at present number well over 1,000.

It would appear that neither the A.M.E.E. nor the E.P.E.A. has appreciated the extent of the anxiety amongst all engineers at this seeming wholesale slaughter, in the name of nationalization, of a large number of men who have spent their lives building up the efficiency of the industry, and it is suggested urgently that they get down to facts at once and tackle the problem without more delay. Their aim should be to postpone further appointments below that of sub-area engineer until the fate of the remaining managerial and technical staffs is known.

ASSISTANT ENGINEER.

[We believe that it is the general policy of the B.E.A. and Area Boards to ensure that officials shall not suffer loss of salary upon appointment, but this does not invalidate our correspondent's main argument.—Editors, *Electrical Review*.]

Electric Pottery Kilns

YOUR interesting article on "Pottery Firing" in your issue dated 14th February, 1947, has just been brought to our notice and we feel obliged to point out the inaccuracy of the statement that ". . . it is only a matter of time before ovens are available with elements which will withstand the temperature up to 1,350 deg C required to fire the majority of china biscuit. It is probable that the first of these high temperature biscuit ovens will be in operation within the next year or so."

The implication that no such kiln was in existence at the time of publication of the article is incorrect since we have been operating an electric tunnel kiln at over 1,400 deg C since 1944. The following few particulars of our kiln may be of interest to your readers:—Type, twin tunnel, counter-flow; length, 178 ft; heating elements, "Globar" carborundum; firing schedule, at present 45 hours; truck setting, 24 by 18 by 8 in.; power input (*a*) both tunnels at over 1,400 deg C—180 kW; (*b*) one tunnel over 1,400 deg C and one at 100 deg C—135 kW.

This kiln has been used for the production of one-fire electrical porcelain, in both tunnels, and also for domestic vitreous ware, soft biscuit in one tunnel and high-temperature glost firing in the other. It would be of interest to us to know whether New Zealand is leading the ceramic manufacturers in Great Britain in this respect.

NEW ZEALAND INSULATORS, LTD.

Temuka, New Zealand. R. S. JONES, *Chief Chemist.*

Power Factor Measurement

IN connection with the article by Mr. R. A. Guest in your issue of 12th March on "Power Factor Measurement" by a form of three-ammeter method, it should be noted that the power factor thus found will, as a rule, differ from the value defined by (watts) ÷ (volt-amps). The current I_1 in the lamp alone; and that taken by the lamp + condenser (I_2) will both be distorted, whilst the condenser current (I_3) is sinusoidal on normal supplies. The response of the ammeter to these distorted waveforms may lead to noticeable errors; in a series of tests on a single lamp, a p.f. of 0·51 was found using Mr. Guest's method, as compared with a figure of 0·48 using wattmeter, voltmeter and ammeter.

Newcastle-on-Tyne. D. H. THOMAS, M.SC., A.M.I.E.E. (Rutherford College of Technology).

New Power Stations

Foundation Stones Laid at Croydon and Wigan

LAST Saturday the Mayor of Croydon (Councillor E. W. Turner) laid the foundation stone of Croydon's new generating station, the first section of which is scheduled to be in operation towards the end of 1949 and the whole station in 1952. Six 52,000-kW sets are eventually to be installed, four of which are now on order. A new feature will be the manner in which the coal-handling plant will be totally enclosed. Mr. F. N. Rendell-Baker, who retires from the position of chief engineer and manager, at the end of this month will continue to act as consulting engineer for the station.

Councillor P. Winstanley, chairman of the Wigan Electricity Committee, laid the foundation stone of the new generating station at Westwood on 17th March. The new station will have an ultimate capacity of 120,000 kW. The first section is to be commissioned by the winter of 1950 and the final section a year later. At a dinner which followed at the Town Hall tribute was paid to the work of the electrical engineer (Mr. A. O. Johnson) and the staff of the Department.

Electricity Joint Committee

Final Gathering

THERE was a company of about sixty at a luncheon which preceded the last meeting of the Electricity Supply Joint Committee on 17th. March. Mr. F. Newey presided over the gathering, most of whom were prominent electrical men.

Before proposing the health of the guests, MR. NEWEY presented flowers to Dame Caroline Haslett (the sole lady guest). In his speech Mr. Newey said that the number of farewell parties now being held did not indicate the complete disintegration of the electricity supply industry; upon the whole they marked a reorganization which, it was hoped, would give even better service to the public. He wished the best of luck to those taking on responsible positions in the new authorities and hoped that while welding the industry into an efficient service they would still leave scope for individual initiative.

In a reference to the electrical press he said that it was in existence before the supply industry began, and it had done much to stimulate the enthusiasm which existed in the early days. He showed by means of a diagram the expansion of the membership of the constituent bodies—the Incorporated Municipal Electrical Association, the London Electricity Supply Association, the Incorporated Association of Electric Power Companies, the Provincial Electric Supply Association, and the Conference of Joint Electricity Authorities and Joint Boards. Special tribute was paid to Mr. J. Mould, who, as president of the I.M.E.A. in 1939, had called the Associations together to form the Committee. Mr. Newey also mentioned other past chairmen and secretaries and made particular mention of Mr. H. F. Carpenter (now secretary of the B.E.A.).

Many of their friends had found positions in the new organization and he assured Lord Citrine (chairman, B.E.A.) of continued co-operation in the endeavour to provide the best possible service to the nation at the lowest cost.

Present Position of the Industry

LORD CITRINE replied in a delightful manner by placing himself, in turn, in the position of each class of guest and expressing their probable views of the present situation in the electricity supply industry. As a manufacturer, he said that given labour and material he could produce the required equipment at reasonable prices. As E.D.A., he wondered whether an association formed to expand the use of electricity would be allowed to continue. Of course they had realized the necessity for encouraging the distribution of the load but one day electricity would be able to expand again and the B.E.A. seemed to appreciate this. As the technical press, he wondered how to deal with all that was happening without sufficient paper and promised that he would keep an eye on the new authorities. As the Electricity Commission, he had had to handle an industry full of personalities but he thought that it had been done successfully. As the Central Electricity Board, he had built the grid at a very difficult time and although some had criticized the scheme the grid had proved indispensable and the new Authority had come into a good heritage.

After dealing with matters from the Ministry's point of view Lord Citrine said that a certain amount of sorrow must be felt at the dissolution of such fine bodies as the industry possessed. They would feel the pangs of parents parting with their children, but he thought that these would give place to parental pride at the success of their offspring. The Authority was endeavouring to make the transition easy and it would behave as reasonably as possible.

MR. W. R. T. SKINNER, deputy-chairman of the South Eastern Electricity Board, proposed the chairman's health and Mr. Newey responded.

Fan Manufacturers

Association's Activities

THE progress which the Fan Manufacturers' Association has made since it was formed four years ago was reported upon by the president, Mr. N. Burke (James Howden & Co., Ltd.) at the annual luncheon held at the Connaught Rooms, London, last week. The objects of the Association, he said, were to promote the interests of producers of industrial fans and to improve the technical and educational aspects of the fan engineering industry. It included in its membership fifteen leading fan manufacturers in the United Kingdom. The Association did not countenance any price fixing or cartel.

Contact had been maintained with Government and other bodies on technical problems, this work involving the standardization and testing of fans and ancillary equipment. The educational sub-committee, in association with heating, ventilating and refrigerating bodies, was establishing a national college to educate technicians in the problems of fan engineering. By the production of an Association handbook and pamphlets on fan engineering, it was educating the public in fan technology.

At the annual meeting which followed the luncheon Mr. D. S. Woodley (Keith Blackman, Ltd.) was elected president in succession to Mr. Burke.

Central Electricity Board

Final Annual Report

ON 1st April the functions of the Central Electricity Board will vest in the British Electricity Authority. Its Twentieth Annual Report made to the Minister of Fuel and Power, which was published last Wednesday (Whitehead Morris, Ltd., 1s. net), is therefore its last. In addition to describing developments during 1947, the Board reviews its achievements during the twenty-one years of its life and states that grid operation has resulted in savings of over £27 million per annum and that the assets to be handed over have a present-day value greatly in excess of the book valuation of just over £42 million, without taking into account reserves of nearly £24 million and a carry-forward of £13 million. Regret is expressed that the Minister was unable to accept its representation that stockholders should be compensated on similar terms to those accorded to holders of local authority loans instead of by British Electricity Stock.

Since the grid was set up there has been a reduction in average price per kWh from 1·65d. in 1925-26 to under 1·08d. in 1946-47, although the price of coal increased 2½ times; the amount of electricity sold increased more than sixfold. Much of the early work of

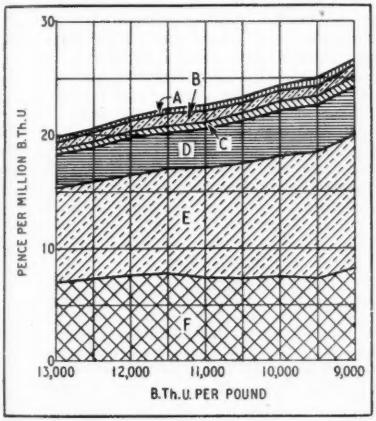


Fig. 1.—Costs of combustion of bituminous coals comparable in quality except for calorific value and ash content. A. Ash disposal. B. Boiler repairs and maintenance. C. Handling to boilers. D. Rail freightage and wagon hire (for average distance). E. Flat rate increases in pithead prices. F. November, 1939, basic pithead price

the Board was of a pioneering character, but its decisions, for instance, with regard to the adoption of multiple earthing, the size of conductor employed and the use of galvanised steel transmission towers, steel-cored aluminium conductors and 132-kV cables have proved to be fully justified. Typical of the high efficiency of operation to-day is the percentage of 95 per cent correct operation of protective gear.

Two features are predominant in the Report—plant capacity and coal. Deficiencies in the first were shown up by load shedding on 122 occasions, as against 54 in 1946 and four in 1945, up to a maximum of 1,831,000 kW or

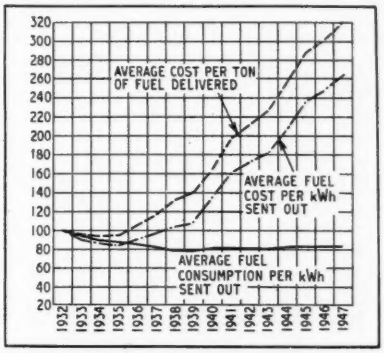


Fig. 2.—Trends of fuel consumption and costs

21 per cent of the total load on the system. The estimated potential demand for the year (in January) was 11,068,000 kW (compared with 10,130,000 in 1946) but, as 15·6 per cent of the plant was out of commission, only 9,060,000 kW could be carried, at 48·7 cycles. The Government, following representations from the C.E.B., introduced staggering of industrial working hours on 6th October with the aim of reducing peaks by about one-third during winter months.

A scheme was evolved under which each undertaking was required to restrict its demand, when necessary, to a target figure. Target working was imposed on 47 occasions.

Public supply generating stations produced 42,597 million kWh. This was about 75 per cent in excess of the 1938 output and 3·2 per cent more than in 1946, but for the last eight months the percentage increase (owing to milder weather and economies by consumers) was only 0·3, although 200,000 new dwelling units were completed and there was an average increase of 6 per cent in industrial employment and of 9 per cent in industrial output. Sales to industrial and commercial consumers declined slightly, but those to domestic and farm consumers increased by 11½ per cent.

The position in regard to generating plant at the end of 1947 was that 11,881,731 kW was installed in 142 selected stations, which was 293,425 kW more than in 1946. Early in the year the Board planned for a further 2,315,750 kW to be completed in 1952, bringing the total new plant for service in 1948-52 to 9,474,450 kW. In accordance with the provisions of the White Paper on Capital Investment, however, the Government decided to cut the programme for 1951 and 1952 by 1,635,250 kW, reducing the number of new stations from thirty-one to twenty-five. The C.E.B. was satisfied, however, that the original programme was necessary to avoid further serious risks of load curtailment, and the Minister exonerated it from blame in this respect. Difficulty in obtaining consents to the use of sites for power stations (three were refused last year) was once again responsible for delays in the construction of power stations.

An account is given of the fuel crisis in February, 1947. In regard to coal prices, the Report points out that between November,

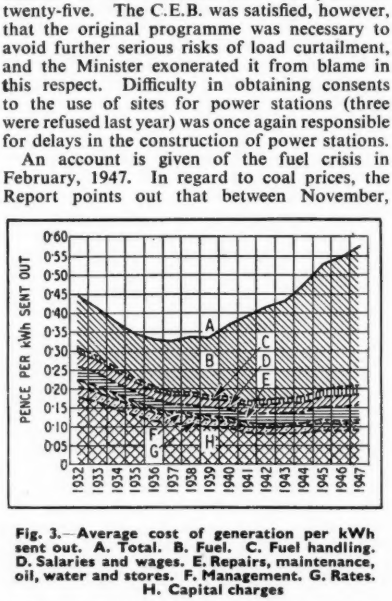


Fig. 3.—Average cost of generation per kWh sent out. A. Total. B. Fuel. C. Fuel handling. D. Salaries and wages. E. Repairs, maintenance, oil, water and stores. F. Management. G. Rates. H. Capital charges

1939, and September, 1947, flat-rate advances progressively decreased the pithead price ratio of all classes of coal to the lower-grade kinds supplied to power stations, the rise being 119 per cent in the first instance and 148 per cent in the case of electricity supply. This disparity was worsened by increases in charges of 55 per cent for rail and canal transport (covering 68 per cent of the tonnage) and of up to 160 per cent for conveyance by sea (25 per cent of tonnage). The effect was to raise the average cost of coal per ton to power stations from 20s. 3d. in 1938 to 48s. 3d. at the end of last year, resulting in a 151 per cent rise in cost per kWh sent out. A further 2s. 6d. was added on 1st January, 1948.

Owing to the inferior quality of the coal (the average calorific value declining from 11,522 to 10,893 B.Th.U. per lb) the average consumption in 1947 at 1·5 lb per kWh sent out compared unfavourably with the 1938 figure of 1·34 lb. A given amount of heat in low-grade coal now costs substantially more than in better-class coal; also the use of the former decreases combustion efficiency (about 1 per cent for each 3 per cent of ash above 10 per cent) and increases the construction cost of boilers. In 1939 under 38 per cent of the coal had an ash content above one-eighth, but in 1946 the percentage had risen to 64. The result was the loss of plant capacity of up to 500,000 kW.

As a result of successful operation for many years of the pipeline type of compression cable at 66 kV, its possible use at 132 kV is being investigated. The first large 132-kV air-blast circuit breakers were commissioned for indoor service last year, and further installations were ordered for outdoor use. Thirty large-oil-volume 132-kV 2,500-MVA circuit breakers were ordered, some for linking the grid to the system of the North of Scotland Hydro-Electric Board. Total breaking time (from closing of protective-gear relay contacts to arc extinction) for the latest designs does not exceed 3 cycles (0·06 sec) for the air-blast and 4 cycles (0·08 sec) for the large-oil-volume types, compared with over 15 cycles (0·30 sec) for the 132-kV oil breakers originally installed on the grid. Both of the new types may be rated up to 3,500 MVA when system conditions make this necessary, and high-speed automatic reclosure is now practicable.

Two new designs of protective gear are based on the change in relative phase positions of a.c. waves at two ends of a transmission line when a fault occurs, the operating relay contacts closing within 0·05 sec. Phase comparison has also been applied to bus-bar protection. In schemes devised for protecting the combined generator and transformer when switching is at 132 kV, relay contacts close in about 0·1 sec. Gas actuated relays proved effective in greatly limiting surge damage to transformer windings. Specifications have been prepared for the terminal transformers at the ends of the 264-kV line to be run from Neepsend to Staythorpe. Two experimental 15,000-kW gas turbines are to be installed in Dunston and Trafford power stations for peak-load duty.

Financial Results

Gross receipts from the sale of energy amounted to over £103 million. After meeting all outgoings, including interest and amortization, the credit balance of the net revenue and appropriation account carried forward was raised by about £1·5 million to £12·7 million. Details are given in an appendix. Other appendices list the generating plant and boilers for which arrangements were made in 1947, the 142 selected stations and 53 other special agreement stations, and particulars of the eight regional areas covered by the grid and in the North of Scotland. The grid itself comprised 5,172 miles of transmission lines, including 3,683 at 132 kV, and 348 switching and transforming stations having an aggregate transformer capacity of 14,267, 200 kW.

Division of S.W. Area

A PROVISIONAL determination has been made of the division of the **South Western Electricity Board's** area. The Board (chairman, Mr. S. F. Steward) will have five sub-areas, as follows:—No. 1 (Bristol)—Bristol, Bath, North Somerset E.S. Co., Mid Somerset E.S. Co., Burnham (Somerset) & District E.S. Co. and Weston-super-Mare & District E.S. Co. No. 2 (Taunton)—Taunton, Bridport, Lyme Regis, Minehead E.S. Co., Wellington Dis. Elec. Co., Bridgwater & Dis. E.S. & Traction Co., South Somerset & Dis. Elec. Co., and Seaton & Dis. E.L. Co. No. 3 (Exeter).—Exeter, Barnstaple, Tiverton, Exe Valley Elec. Co., Culm Valley E.S. Co., East Devon Elec. Co., Bideford & Dis. E.S. Co., Ilfracombe E.L. & P. Co. and Lynton & Lynmouth E.L. Co. No. 4 (temporarily Torquay but probably eventually to be based on Plymouth).—Plymouth, Torquay, Plympton St. Mary R.D.C., West Devon E.S. Co., Bude E.S. Co., Holsworthy E.S. Co., Chudleigh E.L. & P. Co., Dawlish E.L. & P. Co., Teignmouth E.L. Co., Paignton E.L. & P. Co., Brixham Gas & Elec. Co., Dartmouth & Kingswear E.S. Co. and Salcombe Gas & Elec. Co. No. 5 (Camborne).—Cornwall Elec. Power Co., St. Austell & Dis. E.L. & P. Co. and Falmouth Elec. Supply (Electric Supply Corporation).

C.I.G.R.E. Conference

PRELIMINARY particulars of the Twelfth International Conference on Large Electric Systems, which will be held in Paris from 24th June to 3rd July, indicate that previous high standards will be maintained. Subjects of papers to be presented and discussed include: Generation, transformation and switching; construction, insulation and maintenance of overhead and underground lines, operation, protection and interconnection of networks; a.c. and d.c. transmission at very high voltages, corona effect and insulation co-ordination. British authors will contribute papers on pneumatic operation of air-blast circuit breakers (W. A. MacNeil), application of semi-conductive glaze on high-voltage porcelain insulators (V. H. Pirie), neutral earthing (C. W. Marshall), lighting (R. H. Golde), telephonic and radio interference (C. W. Marshall and H. R. S. Klewe), system stability (A. J. Gibbons and E. B. Powell), practical long-line a.c. transmission calculations (P. J. Ryle), corona and surge attenuation on overhead lines (H. M. Lacey) and d.c. transmission (F. Buseman). The technical sessions will occupy all the time at the Conference except two days. Official languages will be English, French and Russian. The secretary of the British National Committee is Mr. R. A. McMahon, Thorncroft Manor, Dorking Road, Leatherhead, from whom registration forms can be obtained.

South African News

From Our Cape Town Correspondent

DURING the war South African firms made switch fuses, and the experience gained in this work has resulted in the production of an improved design which is being used in large quantities in housing schemes. Local industry is also making 500-V distribution boxes and a new e.s. rubber lampholder for industrial lighting. Arrangements have been made with De Renzi Holmes & Co., Ltd., Wolverhampton, to manufacture control gear under licence.

Equipment worth about £1,000,000 has been ordered overseas for the power station that will be built at Worcester. It is hoped that it will be in operation early in 1952. The manager of the Cape Town undertaking of the Electricity Supply Commission, recently returned from a visit to Britain and the United States in connection with the Worcester station. With the extension of electricity undertakings in the Union in recent years, it was becoming difficult to obtain supplies of the type of coal normally used by power stations, he said, and the Commission had had to consider using a lower grade of coal at Worcester. That entailed using a spreader type of stoker and he was sent overseas to find out whether it would be satisfactory. He found that it would, and orders for that and other equipment had been placed in Great Britain.

Preliminary investigation into the Kariba Gorge scheme to provide power for the two Rhodesias has advanced sufficiently to warrant the appointment of engineering consultants during 1948 to go into the question of constructional planning. This is the gist of the latest progress report just published by the Inter-territorial Hydro-Electric Power Commission. The report says it appears that, by means of a dam 250 to 300 ft high across the Kariba Gorge, 500,000 kW could be provided. Data regarding the Kafue Gorge is rather more sketchy.

Punjab Hydro-Electric Schemes

WATER Power schemes now being considered by the West Punjab Government aim at 100,000 kW to meet the requirements of the proposed industrial development of the Province. The Rasul works which will harness the fall from the Upper to the Lower Jhelum Canal, is expected to produce 22,000 kW and a complementary scheme (26,000 kW) is proposed on an escape channel on the Upper Thal Canal. Four further projects have received detailed consideration by the Government, including the building of two dams, each 150 ft high, on the Indus, one between Attock and Kalabagh and the other above Durband, producing more than 400,000 kW.—*Reuter's Trade Service.*

Smaller Undertakings' Meeting

Consumers' Association Proposed

AT the annual general meeting of the Committee of Smaller Electricity Supply Undertakings held at the E.L.M.A. Lighting Service Bureau, London, last Friday a recommendation was put forward by Councillor W. H. Hooper (Dewsbury) on behalf of the Executive Committee to the effect that the Association should be kept in being for at least twelve months, during which time a small sub-committee should hold a watching brief in order to ascertain whether the new "set-up" could be assisted by an association expressing the consumers' point of view. If at the end of that period there appeared to be no necessity for such an association to continue, a general meeting would be called for the purpose of winding up the association; if on the other hand it appeared desirable to set up a new association, including local authorities of all kinds—and possibly gas consumers also—the sub-committee would have power to convene such a meeting. The suggested name for the new association was "The National Electricity Consumers' Council" and its objects would be the protection and promotion of the interests of consumers of electricity, particularly local authorities, which would in the aggregate be large consumers in their various departments.

Councillor Hooper explained that the motion was not "anti-anyone." If nationalization worked smoothly the Association would gladly wind itself up finally but if there was a chance that its services might be useful—the British Electricity Authority itself might be glad of its existence—it would be foolish to disband it. Seconding the motion, Councillor J. Clarke (Malvern) said that the industry was built up on the initiative of engineers and he could see this disappearing. Some members, not represented on the Consultative Councils would be "left out in the cold."

Mr. C. Garfield Richards (Port Talbot) put forward an amendment calling for the winding-up of the Committee and the dissipation of its funds. The Committee was formed, he said, within the framework of the I.M.E.A. to oppose the proposals of the McGowan Report and should be wound up. Mr. T. Wilkins (Penybont), declaring that the association was coming to its natural conclusion, first seconded the amendment but later withdrew.

Mr. A. J. C. DeRenzi, hon. secretary, emphasized that it was not proposed to take any active steps at present so as to give the B.E.A. a fair chance to get into its stride. But it was felt that that they ought to hold a watching brief so that if things went wrong they could call on the Association. It would not be only the small undertakings which would be concerned. Many of the larger ones felt that the I.M.E.A. should have kept an organization going.

Councillor J. Selwyn-Jones (Newton-le-Willows) said he was concerned that there should be in existence some association which understood the problems of electricity supply. He strongly supported the idea of local authorities coming together to assist the supply industry and to continue the aim for a cheap and abundant supply of electricity.

An amendment by Councillor J. T. Evans (Neath) that the meeting should be adjourned until June and that the name of the association should be changed to "The National Electricity Consumers' Council," was carried by forty-seven votes to forty-five. Trustees were appointed to administer the funds in the meantime.

Scientists in Industry

AS a tribute to the two 1947 Nobel Prize winners, Sir Edward Appleton and Sir Robert Robinson, the Federation of British Industries arranged a meeting which was held at the Royal Institution last Friday. Sir Frederick Bain, president of the F.B.I., presided.

Speaking of the work of scientists in industry, Sir Edward Appleton referred to operational research methods. The most important single investigation in this field, he said, was into the problem of finding the most economical method of warming a house—the whole house and not only a small semi-circle in front of one fireplace. In this work they were using a number of experimental houses. He believed operational research methods could be of particular value at the present time because they provided one method by which science could contribute effectively to the pressing problems of national productivity. A great deal of work which was now in the laboratory stage could have little real effect on production for at least two years and probably longer. The results of operational research could often, however, be applied without any such delay.

What scientists valued most of all was the good opinion of their scientific colleagues and it was impossible for them to feel that they could acquire and retain this, if their work was so circumscribed and limited in outlook as to cut them off entirely from the main stream of scientific progress. What mattered most in any scientific activity, in industry or elsewhere, was not so much money and equipment, but men and leadership. In the past Britain had always produced such leaders and from what he knew of the younger scientific generation, he thought we would go on being able to do so.

COMMERCE and INDUSTRY

Lord Citrine at Battersea. Installation Work at Bury.

STEPS taken to obtain a complete system of consultation with workers in the industry were referred to by Lord Citrine, chairman of the British Electricity Authority, last week. He said they had almost reached the end of that road—in the next few days he anticipated that agreements would be signed between all the trade unions concerned. There had hitherto been consultation on the manual and technical sides but the clerical section had not been covered; now they were filling that gap.

Lord Citrine was replying to the toast of "The Electricity Supply Industry" at a dinner commemorating nearly fifty years' administration of the Battersea electricity undertaking and to mark its vesting under the Electricity Act. In proposing the toast the Mayor of Battersea (Councillor F. Humphrey, J.P.) spoke of the great future before the industry and expressed the hope that the new Central Authority would use its powers in the field of research, especially that of generation. He confessed he did not like the name of "British Electricity Authority"—it was apt to get mixed up with "British European Airways." Alluding to this, Lord Citrine said that the difficulty had been foreseen, but it had been thought there would be no clash with "British European Airways Corporation." Perhaps they would follow suit and cut down to "British Electricity."

Proposing the toast of "The Battersea Electricity Undertaking," Mr. H. J. Randall, chairman of the London Electricity Board, referred to the fact that the Mayor had been on the Electricity Committee for fourteen years and Councillor R. C. Kiloh, J.P., for twenty-nine years, twenty-two as chairman. Councillor Kiloh, in reply, paid a tribute to the work of the chief engineers—the late Mr. F. A. Bond (1906-1935), Mr. H. F. J. Thompson (1935-45) and the present engineer, Mr. J. R. Jones.

Contract Price Adjustment Formulæ

The latest figures for use in the B.E.A.M.A. contract price adjustment formulae are as follows:—Rate of pay for adult male labour, 13th March, 110s. (unchanged). Board of Trade index figure for intermediate products, 13th March, 244·2 for the month of February (compared with 239·7 for January).

B.E.A.M.A. and Price Stabilization

The British Electrical and Allied Manufacturers' Association announces that it subscribes fully to the principles of voluntary action set out in the memorandum submitted to the Chancellor of the Exchequer on behalf of the Federation of British Industries, the Association of British Chambers of Commerce, and the National Union of Manufacturers. The Council of B.E.A.M.A. has asked its member-firms to do all they can to put the F.B.I. recommendations into practical effect as soon as possible. The Association emphasizes that reduced prices will depend on how far costs, stabilized in other respects, can be lowered by increased productivity resulting in a greater quantity of goods being produced each week by the same number of people.

Overseas Trade in February

The Board of Trade returns for February show that electrical equipment to the value of £7,172,110 was exported. This was below the record January figure (£8,180,264), but last month contained only 24 working days (against 27). Comparison with February last year is also disturbed owing to the fuel crisis in that month; actually exports then were valued at £4,921,322. Imports of electrical equipment in February had an aggregate value of £139,011, which compares with £131,476 in January and £153,265 in February last year.

Radio Trade Journal's Anniversary

This month the *Wireless and Electrical Trader* (Trader Publishing Co., Ltd., Dorset House, Stamford Street, S.E.1), celebrates its silver jubilee. First appearing as a monthly, it was subsequently for many years published weekly until the outbreak of war, when it changed to fortnightly publication. The present editor is Mr. W. E. Miller, M.A. (cantab), who has completed over twenty years with the paper, and the technical editor is Mr. E. A. W. Spreadbury.

Auxiliary Electrical Plant

The Ministry of Fuel and Power wishes to make it clear that although staggering of hours ends on 29th March it will still be necessary to give all possible relief to the grid. Industrial and other undertakings which have been using auxiliary power installations to take part of their load during peak hours are therefore asked to continue using them until at least the end of April, and not to put them out of action for overhaul, unless absolutely necessary, until the danger of a cold spell in May is past. Although it was made a condition when some of this plant was supplied that it was to be kept in continuous use, it has been agreed that this condition will not be enforced from the end of April to the beginning of October.

"Benelux" Customs Tariffs

An official statement regarding the tariff concessions made by "Benelux" countries in the Geneva agreement includes the following, the newly agreed ad valorem duties being shown in brackets:—Carbon or graphite parts, for

electrical purposes, weighing 50 kg or more (2 per cent) and those of greater weight (6 per cent); electric dynamos, motors, convertors, transformers, and reactance coils (8 per cent or 12 per cent, according to weight); apparatus for measuring and registering electrical energy (except electricity meters) and miscellaneous electrical supplies (10 per cent); radio, television, and like receiving apparatus (20 per cent), amplifiers and various other radio-electrical apparatus for telephony, telegraphy, and television (12 per cent), loudspeakers, microphones and the like (12 per cent). A ceiling of 15 per cent is placed on the possible increase of the present 12 per cent duty on radio valves. The duty on alkaline storage batteries and parts is reduced from 20 to 10 per cent ad valorem. The duty on electric ignition equipment, as well as that on starting and signalling apparatus is fixed at 12 per cent and the rate on lighting apparatus at 20 per cent, while the duty on lighting-starting sets is reduced from 20 to 12 per cent.

Television Sets for Workers

Mr. C. O. Stanley, C.B.E., chairman of Pye, Ltd., announced at the jubilee dinner of the company in Cambridge last week that £5,000 worth of television receivers would be distributed among the factory workers to mark the fiftieth anniversary of the founding of the company, and as a step towards placing television within the reach of people who might not be able to acquire it.

I.M.E.A. Convention Dinner

Mr. Hugh Gaitskell, the Minister of Fuel and Power, is to be the principal guest at the dinner to be held on 10th June during the convention of the Incorporated Municipal Electrical Association.

Marconi Instruments Demonstrations

From 6th to 16th April next, Marconi Instruments, Ltd., is staging a display of new communication test equipment at its London showrooms, 109, Eaton Square, S.W.1. The instruments shown will be additional to those presented at the Physical Society Exhibition.

The company is also holding a demonstration of a new portable receiver tester and other "Measurtest" instruments at the Mechanical Institute, Bradford on 31st March and 1st April.

Maidenhead Fluorescent Lighting

Three fluorescent street lighting installations planned by the British Thomson-Houston Co., Ltd., which recently came into operation in Maidenhead, represent the initial part of a scheme to modernize the street lighting throughout the borough. In the High Street, 16 "Mazdalux" fluorescent lanterns each accommodating three "Mazda" 80 W "Warm-White" lamps, with three separate reflectors, are centrally suspended on catenary wires at an average spacing of 100 ft (30 m). In King Street and Queen Street, a further 26 lanterns are mounted, in staggered formation, on concrete columns at 120 ft (36 m) spacing. Each lantern is constructed of silicon-aluminium alloy and has a translucent plastic cover, rendering it dust-proof and weather resistant. Hinged end-covers allow of lamp changing and starter switch maintenance without removing the "Perspex" cover. A feature of this lighting is the high visibility provided by a single lamp operating in each lantern during the late night economy period. The B.T.H. Co. is also to provide an experimental installation, consisting of six lanterns mounted on concrete columns, along the main Bath Road.

Society of Engineers Examinations

The Society's examinations will be held on 4th and 5th May. Applications to be examined will be accepted up to 20th April. The latest rules and syllabus, and list of exempting qualifications can be obtained from the Secretary, 17, Victoria Street, S.W.1.

Illuminated Crown

A crown of neon tubes over 8 ft high has been constructed by Pearce Signs, Ltd., of New Cross Gate, to the order of King Feisal II of Iraq. It is to be mounted over the king's palace during his birthday celebrations.

International Housing Exhibition

There will be 200 representative exhibitors at the International Housing Exhibition which is to be held at the Empire Hall, Olympia, from 9th to 18th November.

Public Speaking Competition

The E.D.A. public speaking competition for the N.W. England and North Wales Area was held recently in Manchester, the winners being as follows :—Women, first, Miss E. M. Kenyon (Stalybridge Board) and second, Miss Mavis Elliott (Liverpool Corporation). Men, first, Mr. L. J. Downes (Marple U.D.C.) and second, Mr. D. W. Dean (L.E.P. Co.). Among the judges were members of the North Western Electricity Board. Cheques were presented to the winners at the E.D.A. annual luncheon by the Lord Mayor of Manchester. The first-prize winners will compete in the national finals in London.

Installation Work at Bury

Bury Town Council, by a majority vote, recently decided to discontinue the Electricity Department's direct labour installation section. In the discussion, Ald. W. K. Heaton complained of unfair competition by the Corporation at the expense of electrical contractors. When the section was set up in June, 1947, it was never the intention of the Council or Electricity

Department to enter into direct competition with ratepayers, or that the section should take on wholesale installation of domestic and commercial wiring. Quite recently 49 houses in one block had been wired. Speakers for the retention of the section argued that although it did not advertise for work, it had sufficient orders to keep it busy for the next twelve months. Local contractors had been given an opportunity of displaying a list in the electricity showrooms, so that people could choose their contractors, but nothing had resulted from that offer. In addition, the contractors had been able to use the Electricity Department as a wholesale warehouse. The Department had been content with the factors' discount on articles purchased by contractors.

Valve Operation

A small stiff-bound volume entitled "Choosing Valves," for waterworks and pumping practice, has been reissued by Glenfield & Kennedy, Ltd., Low Glencairn Street, Kilmarnock, Ayrshire. It is well printed on good paper, liberally illustrated and includes a chapter on the power operation of sluice valves with electrical circuit diagrams. To this third edition tabulated data have been added as well as information on the uses of " Meehanite " instead of iron castings.

Television in Scotland

Plans have been made by the B.B.C. to bring television to Scotland as soon as it is allocated the necessary labour and materials, said Sir William Haley, Director-General of the B.B.C., speaking in Glasgow at the B.B.C. exhibition to celebrate the silver jubilee of broadcasting in Scotland.

Argentine Imports and Local Production

The value in thousands of Argentine dollars (17 = £1) of some of the principal electrical goods imported into Argentina in 1946 was:— Parts for batteries and accumulators 1,829, compared with 348 in 1945, batteries 1,428 (301), switches, etc. 7,119 (1,326), lamps 11,217 (4,039), radio sets 2,372 (74), electricity meters 2,360 (2,000), underground electric and telephone cable 4,055 (527), other electric and telephone cable 1,056 (940), motors and dynamos over ¼ h.p. 6,821 (2,927), copper wire and cable up to 5 mm cotton covered 1,625 (1,691), ditto lead covered 2,935 (271).

A report by the U.S. Commercial Attaché in Buenos Aires on the market for electrical goods in 1946 states that imports of the larger models of radio sets and radio gramophones were low and for both demand was heavy. There was a considerable increase over 1945 in the sale of locally assembled radio sets.

There was a remarkable increase in the local production of small electric household appliances. In spite of difficulty in importing certain parts and materials, manufacturers were able to double their 1945 output of locally made electric irons, toasters, electric tea-pots and similar appliances. It was believed that this local production had reached the point where it could meet the entire demand of the Argentine market. Larger items such as vacuum cleaners and washing machines were not so plentiful, with rather low domestic production. A considerable shipment of vacuum cleaners arrived from Holland. Only small consignments were received from Sweden and other European countries and from the United States of either vacuum cleaners or washing machines. In the field of cooking and heating equipment the most interesting event, according to the Commercial Attaché, was the campaign carried on by the State Directorate of Gas, which has taken control of most the Argentine gas companies and is actively encouraging the use of gas-burning devices.

Brazilian Electrical Imports

Brazilian imports of electrical goods more than doubled in value between 1945 and 1946. The value (in cr. 1,000) of generators and motors rose from 66,428 to 126,131, radio apparatus from 37,600 to 194,000, telephone and telegraph apparatus from 16,800 to 71,500, and unspecified electrical apparatus from 179,400 to 341,200.

Nickel Alloys

A new monthly publication named " Wiggin Nickel Alloys " is announced as the successor to the pre-war " Monel Notes." It will concern itself with the properties and uses of the wider range of alloys indicated by the new title and is obtainable from Henry Wiggin & Co., Ltd., Grosvenor House, Park Lane, London, W.1. The first issue includes notes on " Monel " and " Inconel " component parts of British army searchlights and reference to " Glowray " and " Ferry " heating elements for electric pads and blankets.

Trade Announcements

McKechnie Brothers, Ltd., have moved their London office to 14, Berkeley Street, W.1. The telegraphic address and telephone number are unaltered.

Telephone Relay Link

A demonstration was given last week by the Plessey Co., Ltd., of a microwave radio link designed for two-way trunk telephone and telegraph communication systems in situations where the installation of land lines is either impossible or undesirable.

The equipment, which utilizes a common aerial for transmitting and receiving, operates on a carrier frequency of 5,000 Mc/s with a peak output power of 400 mW. Reception is direct over a quasi-optical path, the distance attainable depending on the contour of the land.

Eight duplex channels are provided, each with a bandwidth of 4 kc/s, making possible the simultaneous operation of eight mixed speech and multiple telegraph circuits.

Electricity Orders

The Minister of Fuel and Power has made the Electricity (Allocation of Undertakings to Area Boards) Order, 1948 (S.I. 1948 No. 484) which determines in which Area Boards the property, rights, liabilities and obligations of the various authorized undertakers are to vest.

The Electricity (Security Values) (No. 1) Order, 1948 (S.I. 1948 No. 497) declares the value of a list of securities quoted on the London Stock Exchange.

The Orders, price 2d. each, are obtainable from H.M. Stationery Office.

Institute of Welding Meeting

The annual spring meeting of the Institute of Welding is being held at Manchester from 27th to 30th April next.

E.A.W. Conference

The Electrical Association for Women is holding its first post-war three-day conference at Southport from 14th to 16th April when the chief speakers will be Lord Citrine (chairman, B.E.A.), Mr. Hugh Gaitskell (Minister of Fuel and Power) and Dr. P. Dunsheath (past-president, I.E.E.).

B.S.I. Yearbook

A synopsis of each of the 1,400 B.S. specifications now current, prepared by representative committees of 50 different industries, is given in the 1947 edition of the yearbook just issued by the British Standards Institution, 24, Victoria Street, London, S.W.1, price 3s. 6d. post free. A subject index is included as well as lists of standards which have been withdrawn and of work in progress.

Trade Publications

Midland Electric Manufacturing Co., Ltd., Tyseley, Birmingham 11.—Folder describing an all-insulated double-pole slow break a.c. switch and single-pole and neutral-fused switch for a.c. only.

Electro Developments (Leicester), Ltd., 13, Yeoman Street, Leicester.—Priced leaflet on die-cast zinc alloy conduit fittings.

Shelford Bidwell & Co., Ltd., Caxton Works, Garth Road, Morden, Surrey.—Catalogue and price list of enamelled signs, notices and instruction plates for industrial use.

The Morgan Crucible Co., Ltd., Battersea Church Road, London, S.W.11.—Folder describing carbon pile resistances.

Newhalk British Industries, 69, Hornsey Road, London, N.7.—Priced leaflet of radio and television aerials, television amplifiers and aerial matching units.

Cable Strippers, Ltd., Leighton House, Potters Bar, Middlesex.—Descriptive leaflet on the " No Climb " lamp changer.

E.M.I. Sales & Service, Ltd., Sheraton Works, Hayes, Middlesex.—Five leaflets on coffee percolators, toasters and iron stands.

C. H. Blackburn & Co., Ltd., 10, Gray's Inn Road, London, W.C.1.—Leaflet on thermostatically controlled and non-automatic immersion water heaters.

Siemens Electric Lamps & Supplies, Ltd., 38 & 39, Upper Thames Street, London, E.C.4.—Priced catalogue illustrating 4- and 5-ft fluorescent lamps and associated equipment.

Dawe Instruments, Ltd., Harlequin Avenue, Great West Road, Brentford, Middlesex.—Two technical leaflets describing portable battery-operated instruments; 1,400-A—sound level meter and 1,402-A—vibration meter with a frequency range of 2 to 1,000 c/s.

Standard Telephones & Cables, Ltd. (Rectifier Division), Oakleigh Road, New Southgate, London, N.11.—Catalogue (SRT6, issue 2) of medium current single-phase selenium rectifiers.

The Adam Machine Tool Co., Ltd., Hanley Road, Finsbury Park, London, N.4.—Leaflet illustrating a motor drive unit for small lathes.

C. A. Parsons & Co., Ltd., Heaton Works, Newcastle-upon-Tyne.—Technical brochure(A3) on high voltage alternators.

Northern Coachbuilders, Ltd., Claremont Road, Newcastle-upon-Tyne 2.—Leaflet describing a 12-cwt battery electric vehicle.

W. T. Henley's Telegraph Works Co., Ltd., 51, Hatton Garden, London, E.C.1.—Descriptive brochure (No. 46/A) illustrated in colours on the rising main system of wiring blocks of flats and multi-floored buildings.

Ferranti, Ltd., Hollinwood, Lancs.—Leaflet (IN. 21) on hermetically sealed ammeters and voltmeters for use mainly overseas.

Hackbridge & Hewittic Electric Co., Ltd., Walton-on-Thames, Surrey. — Technical brochure describing artificially cooled transformers.

A. P. Lundberg & Sons, Ltd., 491–493, Liverpool Road, Holloway, London, N.7.—Priced catalogue of switches, plugs, sockets and accessories.

INFORMATION DEPARTMENT

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

" **Soulec** " coffee percolator.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

E.R.A. Heat Pump

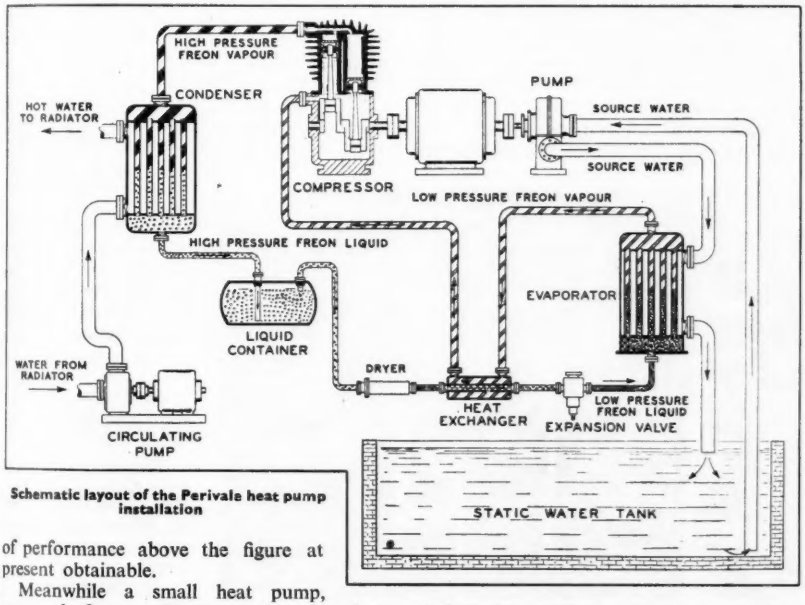
Experimental Installation at the Perivale Laboratories

ONE of the reasons for the preparation more than a year ago of a critical summary (Ref. Y/T.7) by the British Electrical and Allied Industries Research Association of published information about the heat pump was the contemplated examination of the economics of plant of this kind in respect of its suitability for space warming in buildings, especially in view of the increasing cost of coal as an alternative fuel for that purpose.

The issue had also been proposed of a scientific statement on the thermodynamics of the system, with particular reference to nomenclature, while it had been hoped to conduct tests on the installation in the Norwich Corporation Electricity Department in an endeavour to determine those factors which most affect the efficiency of operation and to devise means of raising the coefficient of performance above the figure at present obtainable.

Meanwhile a small heat pump, removed from a German submarine, has been obtained on indefinite loan from the Admiralty and, after slight modification, has been installed in the E.R.A. laboratories at Perivale. Its original purpose was to condition the air in the submarine, heating it when surfaced and cooling it while submerged. It consists of three 4-kW units working in parallel, all alike and each driven by a single d.c. motor, so being adaptable to investigational needs. The plant is installed in a wooden hut that has been erected upon the top of a concrete water tank of 20,000 gallons capacity, which happened to be conveniently available at the laboratories for use as an outdoor source of "low grade" heat.

The thermodynamic operating cycle comprises evaporation, compression, condensation and expansion of a "working fluid," in this case "Freon 12," which refrigerant boils at a temperature of minus 21·7 deg F (— 25·3 C) at atmospheric pressure. The schematic layout diagram indicates that a relatively large volume of water at ordinary outdoor temperature is lifted from the cold tank by a rotary pump and passed through the evaporator, returning thence to the outdoor tank.



Schematic layout of the Perivale heat pump installation

The " working fluid " within the coils of the evaporation (cooler) absorbs low grade heat (as latent heat of evaporation) from the relatively cold water, thereby lowering the temperature of the latter to some extent locally, causing the " working fluid " to change from a liquid into a cold vapour at low pressure.

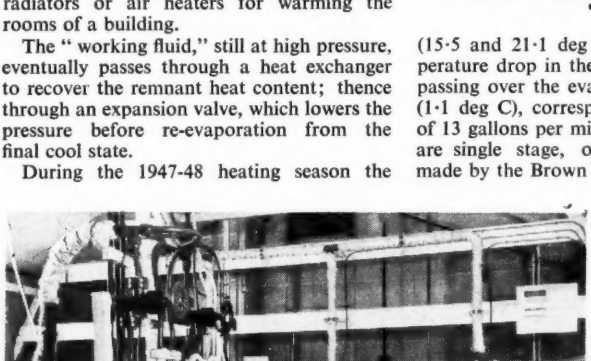
The vaporized refrigerant is then sucked through the compressor (vertical white objects in the photograph background) which raises the pressure to several atmospheres. This action at the same time raises the temperature of the vapour to a useful level before its passage into the (heater) coils of the condenser, visible as lagged cylinders (left in photograph) behind the valve rack.

As the high-pressure hot gas changes back again into liquid form, the latent heat of condensation is abstracted from it by water circulated through the condenser; the water thus acquires a relatively high temperature, which enables it to be usefully employed in radiators or air heaters for warming the rooms of a building.

The " working fluid," still at high pressure, eventually passes through a heat exchanger to recover the remnant heat content; thence through an expansion valve, which lowers the pressure before re-evaporation from the final cool state.

During the 1947-48 heating season the temperature of the outdoor tank water has not fallen below 40 deg F (4·4 deg C), at which value the maximum suction pressure employed has approximated to atmospheric, so that the temperature drop across the coils of the evaporator is between 60 and 70 deg F (15·5 and 21·1 deg C). A convenient temperature drop in the source water while it is passing over the evaporator coils is 2 deg F (1·1 deg C), corresponding to a rate of flow of 13 gallons per minute. The compressors are single stage, of the two-stroke type, made by the Brown Boveri Co. at Heidelberg.

Miss M. V. Griffith is the ivestigator in charge



General view of three 4-kW experimental plant at Perivale

A large thermal storage tank can be used in combination with the heat pump which, by reversing the direction of flow of the refrigerant, may be employed for air conditioning.

The advantage of the system is that the amount of heat energy thus obtainable is between three and four times greater than the equivalent of the electrical energy expended in driving the pump and compressor.

The immediate object of the E.R.A. experiments is to collect performance data under strictly controlled conditions, before proceeding to the investigation of possible alternative sources of " low grade " heat.

ELECTRICITY SUPPLY

Keighley Distribution Scheme. Street Lighting Conversion.

Fleetwood.—ALTERNATIVE POWER STATION SITE.—The Electricity Committee has agreed to make tentative inquiries into the possible use of the salt marsh at Fleetwood as an alternative site for the power station proposed to be built at Poulton-le-Fylde. Farmers in the Fylde rural district have protested against the use of agricultural land for the purpose.

Fulham.—INCREASED COST OF EXTENSIONS.—Because of the general rise in prices and various adjustments which have had to be made in the development of the scheme, a revised estimate of £1,906,000 has been submitted for the extensions at the power station. The original estimate was £1,562,300.

REDUCED DISCOUNT.—In view of the Electricity (Price Control) Order the Electricity and Lighting Committee recommends that the present discount of 20 per cent on electricity accounts shall be reduced to 10 per cent.

Keighley. — DISTRIBUTION SCHEME. — The borough electrical engineer has had an interview with the Electricity Commissioners regarding the proposed laying of an a.c. distribution system in the town centre. The whole of the scheme was approved in principle with a recommendation that certain parts be deferred in view of restrictions on capital expenditure. The Electricity Committee has approved the revised proposals showing an immediate requirement of £56,579.

Leeds.—GRIT ARRESTING EQUIPMENT.—At the monthly meeting of the City Council, Alderman J. Croysdale urged that steps should be taken to expedite acceptance of a contract for grit arresting plant at the Kirkstall power station before the undertaking was nationalized. The new Authority, he thought, might not be so concerned about the people of Leeds as members of the Council were. Alderman C. Jenkinson said he would gladly arrange a special meeting of the Council for the purpose of accepting the contract.

Liverpool.—RENAMING OF COMMITTEE.—As from 1st April the Electric Power and Lighting Committee will be re-named the City Lighting Committee.

Manchester.—NO NEW STREET LAMPS.—Following an application by the Corporation for 200 steel lamp columns for new sites, the Ministry of Health has stated that to save fuel and in view of shortages of materials approval of new street lighting installations must be withheld for the time being.

Penge.—STREET LIGHTING CONVERSION.—In converting 3½ miles of main road lighting from gas to electricity the original equipment, with gas and trolley-bus standards in their original positions, was utilized as far as possible. Estimates showed a net annual saving of about £1,000; a saving of 10 per cent in the basic fuel; and road illumination increased approximately 100 per cent. G.E.C. side-entry "Difractor" lanterns housing "Osram" h.p. mercury-vapour lamps (400-W or 250-W) are employed while along trolley-bus routes both 140-W "Osram" sodium lamps and 400-W mercury lamps are used. The horizontal-burning sodium lamps in top-entry "Refractor" lanterns have been introduced because of the hilly nature of one section and to counteract glare. The installation was carried out by the South Metropolitan Electric Light & Power Co. under the directions of the U.D.C. engineer.

Portland.—FLUORESCENT LIGHTING. — The Electricity Department has recently completed the first part of a fluorescent street lighting scheme consisting of 89 lamps along the main roads through the town. The Council has now approved a scheme put forward by the electrical engineer (Mr. F. Normington) for the conversion to electricity of all the gas street lamps throughout the island.

Pudsey.—ANOTHER DISCOUNT.—Electricity consumers are to receive a 33⅓ per cent discount this quarter, following the 50 per cent given last quarter, as a refund under the Ilkley award.

London J.E.A. Report

TRENDS in the operation of the local distribution undertakings of the London and Home Counties Joint Electricity Authority are well illustrated by coloured graphs in the report of the general manager, Mr. Norman Elliott, for the year ended 31st December last. One in particular, analysing the different classes of supply, shows clearly the big jump in domestic consumption in the last year or two.

Total sales (local distribution) in 1947 amounted to 247·8 million kWh, an increase of 14·4 million over the previous year, and during 1948 it is estimated that 278·7 million kWh will be sold.

Income from the sale of electricity in 1947 amounted to £1,786,259, exceeding the previous year's figure by £45,438, while working expenses, at £1,592,686, were up by £181,454. The average price received per kWh sold was 1·73d. (against 1·79d.), working costs averaging 1·54d. (1·45d.). Total revenue on distribution account was £1,905,147 (against £1,863,966), expenditure aggregating £2,006,096 (£1,853,111). The net result was therefore a deficit of £100,949 (against a surplus of £10,855), reducing the accumulated surplus brought forward to £65,619. Recently the Authority decided to increase the two-part tariff summer quarter "unit" charge in the inner zone from 0·55d. to 0·825d.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

The Northmet Power Co.—Presiding at the final annual meeting on 17th March, Lord Ashfield (chairman) said that on 1st April the company's undertaking would be vested in the Eastern Electricity Board. After reviewing the financial results of 1947 he referred to the subsidiary, the North Metropolitan Power Station Co. The work of constructing the buildings of the new generating station at Rye House was in hand, but in view of the present shortage of labour and materials progress must necessarily be rather slow. Directions had been received from the Central Electricity Board for extensions of plant at this station and also at Brimsdown "B" station. The additional plant included two 32,000-kW turbo-alternator sets at Rye House and one 60,000-kW turbo-alternator at Brimsdown "B" station. Referring to the achievements of the company since its formation, Lord Ashfield said that they were now supplying annually some 1,250 million kWh. The small balance of £1,900 from the past year's working, was very disappointing, and the question of some adjustment to the scale of charges would, at an appropriate time, require careful consideration.

The City of London Electric Lighting Co., Ltd., held its annual meeting on 17th March, when Mr. J. B. Braithwaite (chairman), who presided, mentioned that this was the last annual meeting of the company. Stockholders had received their standard dividend of 7 per cent every year since the 1925 Act came into force, with the exception of the years 1942 to 1944, and on several occasions they had received an additional half per cent. On the consumers' side the average price per kWh was 1·947d., as compared with 2·658d. per kWh for 1926, a decrease of 36 per cent. If the company had been continuing the board would have reduced charges as from 1st January, 1948, probably to the level from which they were raised in 1943. The Bankside station was to be entirely rebuilt and work had begun on this important project. They were proud of the history and achievements of the company and of the efficient organization which they were handing over to the State.

The South London Electric Supply Corporation, Ltd.—Presiding at the annual meeting on 17th March, Sir Robert Renwick (chairman), referred to the handing over of the undertaking on 1st April and gave the value of the ordinary shares and the 4½ per cent debenture stock which had been agreed by the stockholders' representative and the Minister of Fuel and Power. With regard to the results of 1947, despite the fuel crisis early in the year, sales of electricity increased by nearly 3,000,000 kWh, or 3 per cent over the previous year, while receipts from the sales of electricity and meter rentals showed an increase of £10,000 or nearly 2 per cent.

The Lancashire Electric Light & Power Co., Ltd.—Speaking at the annual meeting held on 16th March, Sir Joseph Nall (chairman) said that in this last year of the company's existence further progress had continued. Many more contracts for new industrial supplies had been entered into, including textiles, collieries and other industries. In the interim report of the Cotton Manufacturing Commission recently published it was stated that the Evershed Commission recently estimated that 120,000 automatic looms would be required for a large-scale re-equipment programme. Such looms required built-in electric motors and consequently electrification of the cotton industry must go on if the programme recommended in the report was to proceed. A record number of electric cookers and other appliances, other than fires, had been installed in council property. Following a sampling survey in which 1,500 premises were visited by arrangement with E.R.A. the following were the estimated figures relating to domestic consumers connected:—13,053 cookers (total kW installed 52,470); 5,834 water heaters (12,000 kW); 56,240 radiators (75,080 kW); and lamps, irons and appliances totalling 117,045 kW.

The Electrical Distribution of Yorkshire, Ltd.—Presiding at the annual meeting held on 15th March, Mr. R. W. Wickham (chairman) said it was the last time that he would be addressing the meeting as chairman. In reviewing the history of the company he mentioned that they had acquired by transfer or by direct grant a statutory right to supply electricity in forty-four areas covering 1,228 sq miles, or 2,344 sq miles if the areas of the subsidiary companies were included, with a total of nearly 170,000 consumers. The board had consistently followed a policy of ploughing back into the business a large proportion of the profits in order to build up a sound business.

The Westinghouse Brake & Signal Co., Ltd.—In the course of his speech at the annual meeting held on 16th March, Capt. A. R. S. Nutting (chairman) said that approximately 50 per cent of their total production was exported in one way or another and a substantial part of their income was derived from abroad. Total sales during the past year increased by £275,000, as compared with 1946. Substantial progress had been made and was being maintained in securing increased production. So far as most of the essential raw materials were concerned, they were in a much safer and improved position now as compared with the position in 1946. Difficulties had been encountered in securing components bought outside, but on the whole

their suppliers had done a splendid job. Their order book remained very large with a high proportion for the export market either directly or indirectly.

The **Scottish Power Co.**—Presiding at the final annual meeting which was held recently, Mr. W. Shearer (chairman) after making reference to the transfer of the undertaking to the B.E.A., said that during the past year their plants functioned satisfactorily and despite the severity of the weather during the winter, there were few interruptions. Shortage of generating output capacity forced the Grampian Co. last year to import from stations operated under the direction of the C.E.B. over 40 million kWh. Despite increases in operating costs the rates for supply had remained unchanged. Mr. Shearer concluded with a review of the progress made over the past thirty-eight years.

The **British Power & Light Corporation, Ltd.**—In the course of his speech at the recent annual meeting Air Commodore C. E. Benson (chairman) said that during the year under review they had completed their post-war revision of tariffs of their subsidiary companies and had been able in some cases to make material reductions. They had also discontinued the charging of meter rentals in all their areas.

The **Automatic Telephone & Electric Co., Ltd.**—The subscription list opened on Tuesday last for an issue of 1,000,000 4 per cent redeemable cumulative preference shares of £1 each at 20s. 6d. per share. The proceeds of the issue will be applied to reduction of the bank overdraft (amounting at 1st March, 1948, to £1,053,042), to pay for extensions to the company's buildings, plant and equipment (£160,000), to finance further development of the company's interests overseas (£100,000), and to provide additional working capital required for the increased volume of work in hand.

The **Brush Electrical Engineering Co., Ltd.**, reports a profit for 1947 of £463,213, as compared with a loss of £753,680 for the preceding year, and after deducting £119,264 for depreciation and £6,338 adjustments arising from the previous year's contracts, there is a net profit of £337,611 (against a loss of £912,292). No dividend is recommended on the ordinary stock, the last payment being 4 per cent in respect of 1945. Out of the profits £250,000 is placed to general reserve, £5,922 is repaid to an associated company in respect of the half-year's dividend on preference stock to 30th September, 1946, £12,704 preference dividend for the year to 30th September, 1947, and £10,001 goodwill written off, less share premium account £8,480. After deducting the loss brought in of £49,492, a credit balance of £17,972 is carried forward.

R. B. Pullin & Co., Ltd., report a trading profit for the year ended 30th September last of £13,784, as compared with £5,711 for 1945-46. The dividend for the year is 10 per cent (against 12½ per cent).

The British Engine Boiler & Electrical Insurance Co., Ltd., reports that the amount credited to profit and loss account for 1947 is £117,926, as compared with £80,783 for 1946. The final dividend is 17s., making 34s. (same) per £5 share. The balance carried forward is £343,433 (against £300,974 brought in).

J. & E. Hall, Ltd., report a net profit for 1947 of £65,333, as compared with £55,772 for the preceding year, to which is added £1,366 provision for pension scheme not required. The ordinary dividend for the year is unchanged at 10 per cent and £162,851 is carried forward (against £137,072 brought in).

The Electric Supply Corporation, Ltd., reports a net revenue for 1947 of £41,668, as compared with £43,597 for the preceding year. The final ordinary dividend is 6½ per cent, again making 10 per cent for the year. The balance carried forward is £68,716 (against £59,017 brought in).

The Lewes & District Electric Supply Co., Ltd., reports a net revenue of £19,837 for 1947 (against £21,072 for 1946). The dividend is unchanged at 10 per cent.

The Midland Counties Electric Supply Co., Ltd., reports gross revenue from sales of electricity of £3,848,412 for 1947, as compared with £3,531,935 for 1946, and traffic receipts from road transport of £859,197 (against £836,814). The consolidated net revenue is £819,143 (against £900,762), to which is added £43,322 brought forward. The final ordinary dividend is 6½ per cent, making 10½ per cent for the year, and £120,543 is carried forward.

The Sheerness & District Electric Supply Co., Ltd., reports a revenue for 1947 of £40,041, as compared with £44,933 for 1946. The dividend for the year is 10 per cent (unchanged).

The Woking Electric Supply Co., Ltd., reports a net revenue for 1947 of £98,104, which with interest and £21,473 brought in, makes £122,903. Income tax requires £11,309 and the final ordinary dividend is £8 3s. 7·632d. per cent, making £14 3s. 7·632d. per cent for year (same).

Ericsson Telephones, Ltd., reports net profits for 1947 of £206,844, as compared with £100,911 for 1946. The final dividend is 12 per cent, plus a bonus of 3 per cent, maintaining the distribution for the year at 20 per cent, tax free.

The Bognor & District Gas & Electricity Co. reports a profit for 1947 of £29,476, as compared with £29,824 for 1946. The dividends for the year are £7 5s. per cent on the consolidated ordinary "A," £8 7s. per cent on "B," and £6 15s. per cent on the new consolidated.

The Boston & District Electric Supply Co., Ltd., reports a profit for 1947 of £33,468 (against £13,875 for 1946). The dividend for the year is 10 per cent (unchanged).

The Colne Valley Electric Supply Co., Ltd., reports a net profit for the past year of £12,151,

as compared with £27,024 for 1946. The final dividend is 5 per cent, making 8 per cent for the year (unchanged).

A. C. Cossor, Ltd., announces that no interim ordinary dividend will be paid (against 6 per cent).

The Musselburgh & District Electric Light & Traction Co., Ltd., shows a surplus for 1947 of £9,793. The dividend for the year is maintained at 4 per cent.

The Northwood Electric Light & Power Co., Ltd., shows a net profit of £19,632 for 1947 (against £23,127 for 1946). The ordinary dividend for the year is again 8 per cent.

The Weston-super-Mare & District Electric Supply Co., Ltd., reports a net revenue for 1947 of £75,992, as compared with £77,847 for the preceding year. The ordinary dividend is maintained at 8 per cent, tax free.

The Nigerian Electric Supply Corporation, Ltd., has declared an interim ordinary dividend of 4 per cent, actual, less tax (against 3 per cent). It is not anticipated that the total distribution will exceed that for the previous year.

New Companies

Christy Brothers (Chelmsford), Ltd.—Public company. Registered 13th March. Capital, £100,000. To acquire all or any of the assets (including shares in Christy Brothers (Wireless Relays), Ltd.), and liabilities of Christy Brothers & Co., Ltd.; and to carry on the business of mechanical and electrical contractors, etc. Directors: Frank Christy, M.I.E.E., H. J. Aylott, M.I.E.E., C. E. Smith, G. Christy, B.Sc. (Eng.), and A. A. Gates, A.C.I.S. Regd. office: 171, Broomfield Road, Chelmsford.

Modern Electric (Installations), Ltd.—The business addess of this company, the registration of which was recorded in our issue of 12th March is:—184, Royal College Street, Camden Town, London, N.W.1 (temporary telephone number: Gulliver 5915).

Resinoid & Mica Products, Ltd.—Registered 13th March. Capital, £75,000. To acquire the undertaking, property and assets mentioned in an agreement with Southern Areas Electric Corporation, Ltd., etc. Solicitors: Slaughter & May, 18, Austin Friars, E.C.

Office Communication Co., Ltd.—Registered 13th March. Capital, £1,000. Manufacturers, merchants and factors of telephonic, telegraphic and electrical apparatus and supplies, etc. Directors: P. H. Hazleman, J. M. Poulain, and J. W. Chappell, 4, Medina Terrace, Hove. Regd. office: 36, Bruton Place, W.1.

Hotentot Industries, Ltd.—Registered 19th February. Capital, £7,500. Manufacturers of, and dealers in, electrical geysers and water heaters and other electrical appliances, etc. Directors: E. E. Tully and R. G. Norris. Regd. office: 9, Rumford Street, Liverpool.

Logan Electric, Ltd.—Registered 19th February. Capital, £1,000. Electrical engineers and contractors, etc. Directors: Mrs. F. R. Walker, E. A. Walker and W. Walker. Regd. office: 120, Ladbroke Grove, W.10.

Fields Cable & Electric Co., Ltd.—Registered 23rd February. Capital, £1,000. Cable, electrical, mechanical and general engineers, manufacturers of, and dealers in, cables and electrical apparatus, wireless, etc. F. A. Harlow signs as director. Regd. office: 58, Paddington Street, W.1.

Increases of Capital

Philco Radio & Television Corporation of Great Britain, Ltd.—Capital increased by £99,900, in 399,600 5s. shares, beyond the registered capital of £100.

Hilger & Watts, Ltd.—Capital increased by £412,400, in 187,450 5 per cent cumulative preference and 224,950 ordinary shares of £1 each, beyond the registered capital of £100. The company was made public on 23rd February, 1948.

Wright Electric Motors (Halifax), Ltd (formerly Wright (Electric Power Specialities), Ltd.—Capital increased by £6,000, in £1 shares, beyond the registered capital of £6,000.

London Transformer Products, Ltd.—Capital increased by £5,000, in £1 ordinary shares, beyond the registered capital of £20,000.

Liquidations

United River Plate Telephone Co., Ltd.—Winding up voluntarily. Meeting at 67, Broad Street, New York, U.S.A., on 8th April to receive the report of the liquidator, Mr. W. H. Freng.

Drake & Gorham Electrolumination, Ltd.—Winding up voluntarily. Claims to the liquidator, Mr. F. E. Metters, Layton's Buildings, 199, Borough High Street, London, S.E.1, by 8th April. (This notice is purely formal; all creditors have been or will be paid in full).

Electron Equipment (Portsmouth), Ltd.—At a meeting of members on 8th March a resolution was passed that the company should be wound up voluntarily and that Mr. R. G. Nobbs should be appointed liquidator.

Bankruptcies

A. A. Lumelino, lately trading as the Star Electrical Service, 6a, Cranley Mews, South Kensington, London, S.W.5, electrical contractors.—First meeting 31st March and public examination 4th May at Bankruptcy Buildings, Carey Street, London, W.C.2.

A. H. Smith, lately carrying on business at 62-64, Lower Sloane Street, London, S.W.1, electrical engineer.—First meeting held 19th March. Public examination 27th April at Bankruptcy Buildings, Carey Street, London, W.C.2.

STOCKS AND SHARES

THE financial atmosphere remains charged with numerous elements of uncertainty, amongst which the forthcoming Budget is the most conspicuous. Every Stock Exchange broker knows how reluctant his clients are to venture far into the markets at the present time, preferring to wait until after 6th April before coming to a decision as to how to employ money, of which considerable sums are known to be available for investment.

Valediction

Electricity supply shares are ending up their existence at a discount of about 2¼ per cent on their full compensation prices. Next week will show whether the market is right in assuming that, like the former Home Railway proprietors, stockholders will receive a Government stock worth that much less than their entitlement. The stocks, together with those of the C.E.B., have necessarily been removed this month from our price-lists.

Reinvestments

As recently discussed here, exchanges out of British Electricity Stock into higher-yielding or more progressive securities may well have an influence on other markets over the next few weeks, although scarcely to the extent of the boomlet which accompanied the Home Railway deal. In anticipation of a demand for electrical equipment shares, a firm of Stock Exchange dealers has published the statistics for a wide range of companies recommended for investment by virtue of their distinguished records and strong positions, with particular reference to a satisfactory earnings cover for the dividends. On the basis of the last-published accounts, the firm calculates percentage earnings after profits tax at both 25 per cent—the prevailing rate on distributed profits—and at 40 per cent, a Budget contingency, the tax being applied conservatively to total profits, whether distributed or not.

Earnings and Dividends

Here is a brief selection from the list referred to above:—

Ordinary Share	Earnings after P.T.		Last Div.
	25%	40%	
Associated Elec. Ind.	26·5	20·6	15
General Electric ..	27	20	17½
Henley's	33·4	26·6	20
Johnson & Phillips	21	16·8	15
Walsall Conduits ..	109	85	70
Aron	25	20	15
Auto Tel.	27·2	21·7	12½
Siemens	10·5	8	7½
Ward & Goldstone	185	147	50

Dividend Limitation

Limitation of company dividends is coming to be accepted as having arrived, for the present, on the investment scene. In the opinion of many people, the only question to be seriously debated is whether it shall be voluntary or compulsory. Exchanges between the Chancellor and the F.B.I. have left the matter open. Six weeks ago, the Chancellor asked the trade associations for suggestions about the reduction of prices and profits, and the limitation of dividends. On the latter subject, the F.B.I. proposed, in its reply, a voluntary ceiling at the level established in a company's last financial year, adding later that the proposal was supported by many of the leading industrial firms.

Voluntary Action

Ever Ready have made an announcement that no increases in dividend will be recommended this year. British Aluminium reported profits of £2,123,000 against last year's £1,368,000, and, having raised the interim by 2 per cent, proceeded to cut the final to the same extent, leaving the total at 10 per cent as before. Ericsson Telephones are no more than maintaining the distribution at 20 per cent tax-free, despite the doubling of the profits. Brush Electrical Engineering, having converted last year's loss of £754,000 into a profit of £463,000, still recommend no ordinary dividend.

East African Power

East African Power & Light 20s. ordinary shares have been attracting attention by virtue of the undertaking's position in relation to the official plans for Colonial development, and because, also, of the company's East African registration. The latter leaves the company unconcerned with the British Budget. The company has an impressive record, having maintained a 7 per cent dividend on ordinary capital increased by stages from £545,000 in 1935 to the present figure of £1,113,000. Further capital is required to continue an extensive development programme. The Uganda interests are being expropriated by the local authorities, but there is no indication of similar action by the Kenya and Tanganyika Governments. On these considerations, buyers of the shares at 42s. are content, at this stage, with a modest 3¼ per cent return on their money.

Switchgear & Cowans Dividend

Switchgear & Cowans have restored the dividend for 1947 to 20 per cent, and, with it, the equanimity of shareholders who were disconcerted a year ago by the reduction of the distribution from 25 (including bonus of 5 per cent) to 10 per cent. Except for 1946, which covered the reconversion period, and the early war years, a well-covered 20 per cent has been the normal dividend for a decade. Although the shares have depreciated along with most other industrials, the price has, for most of the time, overlooked last year's relapse in favour of an anticipated recovery which has duly materialized. Although, therefore, the dividend and preliminary profits statement were received with satisfaction, they had been discounted too far for them to have much effect. The 5s. shares at 18s. 6d. yield £5 8s. per cent.

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 18 Mar. 1948	Month's Rise or Fall	Yield p.c.
Overseas Electricity Companies					£ s. d.
Atlas Elec. ..	Nil	Nil	14/6 ..		—
Calcutta Elec. ..	6†	6†	40/–	–1/–	3 0 0
Cawnpore Elec...	13	13	55/– ..		4 14 6
EastAfricanPower	7	7	41/6 ..		3 7 8
Jerusalem Elec...	5	6	20/3	–6d.	5 18 5
Madras Elec. ..	8	5	39/6 ..		2 10 5
Nigerian Elec. ..	12½	10	35/-	–⅛	5 14 3
PalestineElec."A"	6†	7†	32/6 ..		4 6 2
Perak Hydro-elec.	6	7	15/6 ..		—
Tokyo Elec. 6% .	—	—	52½	–2	—
VictoriaFallsPower	19	19½	7⅛	+¼	2 16 0
WhitehallInv.Pref.	—	6	25/6 ..		4 14 1
Equipment and Manufacturing					
Aron Elec. Ord...	10	15	50/– ..		6 0 0
Assoc. Brit. Eng.	12	12	37/6	–⅛	6 8 4
Assoc.Elec.Ord...	10	15	75/– ..		4 0 0
AutomaticTel.&El.	12½	12½	60/9	–⅛	4 2 3
Babcock & Wilcox	12½	15	68/9	+⅛	4 7 3
Baldwin,H.J.(2/–)	10	20	9/6	–6d.	4 4 2
British Aluminium	10	10	46/–	–1/6	4 7 0
B.I. Callender's..	—	6¾	33/9	+⅛	3 18 6
British Rola (2/–)	15	10	3/3	–3d.	6 3 2
BritishThermostat (5/–)	18½	23½	23/9	–⅛	4 18 9
BritishVac.Cleaner (5/–)	30	20	13/9 ..		6 18 0
Brush Ord.(5/–)..	4	—	6/6	–6d.	—
Burco (5/–) ..	20	35	25/9	–6d.	6 15 8
ChloridеElStorage	20	20	95/– ..		4 4 2
Christy Bros. ..	17½	17½	80/ ..		4 7 6
Cole, E. K. (5/–)..	20	22½	17/6	–3d.	6 8 10
Cossor, A. C. (5/–)	12½†	25	15/6	–6d.	8 1 4
Crabtree (10/–) ..	17½	17½	38/6	–1/–	4 11 0
CromptonParkinson Ord. (5/–) ..	22½	22½	26/6	+1/–	4 5 0
De La Rue (5/–)	45	50	42/6	+⅛	6 1 1
Decca (1/–) ..	112½	112½	31/3	–⅛	3 12 9
E.M.I. (10/–) ..	8	6	17/6 ..		3 8 8
Elec. Construction	12½	12½	47/6	–⅛	5 5 1
Enfield Cable Ord.	12½	7½	33/3	–⅛	4 10 4
English Electric .	10	10	48/9	–6d.	4 2 0
Ericsson Tel. (5/–)	20†	20†	44/6	+2/–	2 5 0
Ever Ready (5/–)	40	40	34/6	–2/–	5 16 0
Falk Stadelmann	10	15	45/-	–⅛	6 13 4
Ferranti Pref. ..	7	7	36/–	–1/-	3 17 9
G.E.C. Ord. ..	17½	17½	85/–	+⅛	4 2 6
GeneralCables(5/–)	25	50	42/6	–5'–	5 18 0
Greenwood&Batley	15	15	50/– ..		6 0 0
H.T.A. (10/–) ..	10	10	16/6	–1/–	6 1 3
Heatrae (2/–) ..	12½	12½	5/– ..		5 0 0
Henley's (5/–) ..	20	20	23/–	–1/–	4 7 0
Hopkinsons ..	20	22½	95/– ..		4 14 9
Intl. Combustion (5/–)	37½	37½	46/3	–⅛	4 1 3
Johnson & Phillips	15	15	67/6	–2/-	4 9 3
LancashireDynamo	22½	22½	5	–½	4 10 0

Company	Dividend Previous	Dividend Last	Middle Price 18 Mar. 1948	Month's Rise or Fall	Yield p.c.
Equipment and Manufacturing (*Continued*)					£ s. d.
Laurence,Scott(5/–)	12½	12½	10/6	–6d.	5 19 1
London Elec.Wire	7½	10	42/6	–3/9	4 14 1
Mather & Platt ..	11	11	51/3	+½	4 6 8
Metal Industries(B)	9	10	45/–	+6d.	4 9 0
Mid. Elec. Mfg. ..	35	35	8	–5/–	4 7 6
Murex	20	20	78/9	–5/–	5 1 6
Newman Ind.(2/–)	22½	22½	6/6	–9d.	6 18 6
Plessey (5/–) ..	80	20	16/3	–⅛	6 4 0
Parsons C. A. ..	—	12½	61/3	–6/3	4 1 8
Pye Deferred (5/–)	25	25	20/–	–⅛	6 5 0
Radio & Tel. (2/–)	40	—	6/6	–6d.	—
Revo (10/–) ..	20	27½	53/9 ..		5 2 6
Reyrolle ..	12½	12½	61/3	–½	4 1 8
Scophony (5/–) ..	—	—	3/6 ..		—
Siemens Ord. ..	7½	7½	32/9 ..		4 11 9
Strand Elec. (5/–)	12½	17½	10/6	–1/–	8 6 8
Switchgear&Cowans (5/–) ..	10	20	18/6	–6d.	5 8 0
T.C.C. (10/–) ..	12½	15	35/– ..		4 5 9
T.C. & M. ..	10	10	47/– ..		4 5 0
Telephone Mfg.(5/–)	9	9	9/3 ..		4 17 3
Thorn Elec. (5/–)	20	25	21/3	–⅛	5 18 0
Tube Investments	22½	25	6⅞	+½	4 0 8
Vactric (5/–) ..	Nil	Nil	10/–	–2/–	—
Veritys (5/–) ..	7½	2½	5/– ..		2 10 0
WalsallConduits(4/–)	55	70	53/9 ..		5 3 6
Ward & Goldstone (5/–)	35	50	52/6	–8/9	4 15 3
Watford (2/–) ..	15	15	6/– ..		5 0 0
WestinghouseBrake	14	14	63/9	+⅛	4 8 0
West, Allen (5/–)	7½	10	10/–	–6d.	5 0 0
Transport and Communications					
Anglo-Am. Tel.: Pref.	6	6*	110	–5½	5 9 1
Def.	1½	1½*	17½	–¾	8 11 6
Anglo-Portuguese	8	8	30/– ..		5 6 8
Brit.Elec.Traction: Def. Ord. ..	45	50	1775	–125	2 16 2
Calcutta Trams..	7½	Nil	32/6 ..		—
Cape Elec. Trams	5	6	32/9 ..		3 13 2
Cable & Wireless: 5½ Pref. ..	5½	5½	122½ ..		4 9 9
Ord.	4	4	179	–8½	2 4 9
CanadianMarconi$1	Nil	4 cts.	9/6	–6d.	—
Globe Tel. & Tel.Ord.	8½†	5†	42/6	–1/–	2 7 0
GreatNorthernTel. (£10)	18	15	25½	–3	5 17 8
Inter. Tel. & Tel.	Nil	Nil	20	+1½	—
Marconi-Marine..	7½	7½	31/6	+1/6	4 15 3
Oriental Tel. Ord.	4	10	49/3	–3/3	4 1 4
Telephone Props.	6	6	18/6 ..		6 9 9
Tele. Rentals (5/–)	10	10	10/3 ..		4 17 7
T. Tilling ..	10	10	97/6	+1/–	2 1 0

* Dividend postponed.

† Dividends are paid free of Income Tax.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1941

INTERAERO Industrieele Handel-Sonderneming.—" Electric switch." 11266. 25th January, 1939. (599186.)

1942

Sperry Gyroscope Co., Inc.—"High-frequency electron discharge tube structures." 9107. 31st October, 1941. (599129.)

1943

British Thomson-Houston Co., Ltd.—" Protective systems for electric circuits." 13054. 19th August, 1942. (599187.)

British Aluminium Co., Ltd., and A. N. D. Pullen.—" Electrolytic treatment of aluminium, and the like." 15952. 28th September, 1943. (599188.)

1944

Decca Record Co., Ltd., H. F. Schwarz and W. J. O'Brien.—" Electric condensers." 3787/8. 29th February, 1944. (599009/10.)

Budd Induction Heating, Inc.—" Induction heating apparatus." 5892. 2nd March, 1943. (Addition to 560837.) (599072.)

T. Kenney.—" Electric hair curling devices." 17381. 12th September, 1944. (599191.)

British Thomson-Houston Co., Ltd., and W. J. Scott.—" Tuning of cavity resonators for electric oscillations." 18954. 3rd October, 1944. (599192.)

Radio Corporation of America.—" Image forming optical systems for use in colour television apparatus or colour photography." 20745. 29th November, 1943. (599134.)

General Electric Co., Ltd., and J. Sharpe.—" Apparatus for translating electrical image signals." 21409. 1st November, 1944. (599076.)

W. L. Shaw and J. Sykes.—" Directional radio systems." 25280. 16th December, 1944. (599135.)

Foster Transformers & Switchgear, Ltd., Lancashire Dynamo & Crypto, Ltd., and R. E. Jennings.—" Automatic d.c. voltage control systems." 25798. 22nd December, 1944. (Cognate application 32707/45.) (599136.)

British Thomson-Houston Co., Ltd., and W. S. Melville.—" Monitoring of pulse generating circuits." 25949. 27th December, 1944. (599137.)

1945

H. H. G. Grell.—" Method of, and apparatus for, electrically treating material." 73. 1st January, 1945. (599193.)

General Electric Co., Ltd., J. Hanson and E. Wilson.—" Mountings for piezo-electric crystals." 789. 9th January, 1945. (598954.)

London Passenger Transport Board and F. H. Dickinson.—" Electrical devices for the automatic control of a variable quantity." 3598. 13th February, 1945. (599139.)

Hoffmann-La Roche, Inc.—" Electrolytic reduction of organic compounds." 3708. 17th February, 1944. (Cognate application 3709/45.) (599140.)

M. P. Winther.—" Eddy current dynamometers, brakes or the like." 5882. 2nd March, 1944. (599143.)

Muirhead & Co., Ltd., and H. Shorland.—" Electro-mechanical tuning forks." 6886. 19th March, 1945. (598963.)

J. H. Mitchell.—" Electronic a.c. bridge circuits." 7760. 27th March, 1945. (Cognate application 16328/45.) (599146.)

Bendix Aviation Corporation.—" Detecting apparatus for electromagnetic radiation." 8484. 13th March, 1944. (598966.) " Capacitor." 23730. 14th September, 1944. (599169.)

L. E. Currah.—" Frequency-control of multivibrators." 10214. 23rd April, 1945. (599080.)

Soc. d'Application des Brevets Cotal.—" Electromagnetic clutches and brakes." 10889. 19th October, 1943. (Addition to 591091.) (598968.)

Metropolitan-Vickers Electrical Co., Ltd., and J. E. M. Coombes.—" Rectifying electric circuit arrangements." 11308. 3rd May, 1945. (598969.)

General Electric Co., Ltd., and R. B. Mackenzie.—" Electron discharge valve circuits." 11857. 11th May, 1945. (598970.)

P. R. T. Laboratories, Ltd., and W. E. Benham.—" High-frequency amplifiers." 11916. 11th May, 1945. (Cognate application 11234/46.) (599201.)

Standard Telephones & Cables, Ltd., E. A. Richards and W. E. Pease.—" Voltage control in rectifying arrangements." 12603. 18th May, 1945. (599018.)

A. H. Stevens (Eureka Vacuum Cleaner Co.).—" Suction cleaners." 13318. 28th May, 1945. (598972.)

Marconi's Wireless Telegraph Co., Ltd.—" Valve circuits for producing expotential deflecting and centreing potentials." 13490. 20th August, 1942. (598973.)

W. C. Davey.—" Electric indicators and counters." 13700. 31st May, 1945. (598974.)

General Electric Co., Ltd., D. W. Berry and R. Mawson.—" Electrical oscillation generators." 14543. 8th June, 1945. (599149.)

Farnsworth Television & Radio Corporation.—" Photocells." 15300. 7th April, 1944. (599151.)

L. B. Turner and J. Buckingham.—" Ultra-

high-frequency impedance transformers." 16551. 28th June, 1945. (599021.)

W. W. Triggs (Farnsworth Television & Radio Corporation). — "Electromagnetic deflecting coils for a cathode-ray tube." 16983. 3rd July, 1945. (598981.)

K. James.—"Means for generating electrical time base impulses." 21582. 23rd August, 1945. (599218.)

H. E. Holman.—"Manufacture of metal screens and electron discharge devices comprising such screens." 22273. 29th August, 1945. (598994.)

E. K. Cole, Ltd., and J. N. I. Evans.—"Electric fluorescent lamps." 23462. 12th September, 1945. (Cognate applications 26378/45 and 33737/45.) (599028.)

A. Reyrolle & Co., Ltd., A. T. Robertson and E. R. Hanson.—"Electric multi-screw ship propulsion systems." 23524. 12th September, 1945. (599031.)

Instanta Electric, Ltd., and L. C. Bentley.—"Electric relays, more particularly relays of the alternating current type." 23587. 13th September, 1945. (599093.)

Imperial Chemical Industries, Ltd., A. S. Drummond, B. Jacob and B. J. Habgood.—"Electrical insulation." 23602. 13th September, 1945. (Cognate application 9645/46.) (599097.)

H. C. Gibson.—"Electrical remote control systems." 23688. 13th September, 1945. (599113.)

British Thomson-Houston Co., Ltd., and E. H. B. Martin.—"Electro-magnets." 23754. 14th September, 1945. (599220.)

E. Gaunt.—"Adaptors or connectors for use with articles adapted to be heated electrically by means of a heater element incorporated therein." 24925. 29th August, 1946. (599224.)

English Electric Co., Ltd., and F. G. Rowland.—"Gas-blast electric circuit breakers." 25280. 28th September, 1945. (599226.)

Allmanna Svenska Elektriska Aktiebolaget.—"Spring mechanism for causing rapid movement of electric switch contacts, or valves." 26136. 13th November, 1944. (599228.)

Westinghouse Electric International Co.—"Fluid-blast electric circuit interrupters." 27228. 17th October, 1944. (599229.)

General Electric Co., Ltd., and E. Friedlander.—"Electrical filter circuits." 27742. 22nd October, 1945. (599051.)

Hazeltine Corporation.—"Ultra-short-wave signal-translating electron discharge apparatus incorporating cavity resonator circuits." 28812. 30th November, 1944. (599056.)

P. E. F. Kruger.—"Rotary contact device for the connection of electrical conductors." 30020. 18th August, 1942. (599058.)

R. Morton.—"Electric organs, and like musical instruments." 30065. 10th November, 1945. (Cognate application 10292/46.) (599059.)

Patelhold Patentverwertungs- & Elektro-Holding Akt.-Ges.—"Frequency modulation of micro-wave generators." 30434. 14th July, 1945. (599061.)

Next Week's Events

Wednesday, 31st March

LONDON.—Savoy Hotel, W.C.2, 12.30 for 12.45 p.m. Provincial Electric Supply Association. Farewell luncheon.

Savoy Hotel, W.C.2, 12.45 for 1 p.m. London and Home Counties J.E.A. Luncheon.

BLACKBURN.—White Bull Hotel, Church Street, 7.30 p.m. A.S.E.E. Preston Branch. "District Heating," by J. F. Bridge.

SHEFFIELD.—Royal Victoria Station Hotel, 6.15 p.m. I.E.E. Sheffield Sub-Centre. Lecture summarizing papers read at convention on "Automatic Regulators and Servo Mechanisms," by Dr. J. C. Evans.

Thursday, 1st April

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. "Analysis-Synthesis Telephony with special reference to the Vocoder," by R. J. Halsey and Dr. J. H. Swaffield.

Friday, 2nd April

LONDON.—Connaught Rooms, W.C.2, 6 for 6.30 p.m. Association of Supervising Electrical Engineers. Annual dinner and reunion.

Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. Discussion on "High-Speed Recording of Optical and Electrical Transients," to be opened by H. A. Prime.

39, Victoria Street, S.W.1, 6.30 p.m. Junior Institution of Engineers. Discussion on "Some Recent Advances in Science," to be opened by L. H. A. Carr.

NEWCASTLE-ON-TYNE.—King's College, 6.30 p.m. I.E.E. North-Eastern Students' Section. "The Hydro-electric Scheme in Norway," by Messrs. Bishop and Jarvis.

Atomic Research

THE Betatron which has been presented to the Clarendon Laboratory, Oxford, by the Research Laboratory of the British Thomson-Houston Co., Ltd., is the first of this type to be designed and constructed in this country. Its function is to accelerate electrons, which travel about 1,000 miles in an evacuated tube without hitting the sides. Earlier Betatrons have followed the design introduced by Kerst in the United States during the war; this employed a single a.c. magnetic field which both links and surrounds the circular orbit of the accelerating electrons. By rearranging the magnetic circuit, Dr. K. J. R. Wilkinson in collaboration with Mr. H. S. Holbrook, both of the B.T.H. Co.'s staff, have produced the new B.20 which, weighing 17 cwt and capable of being contained in a cylinder 33 in. (83·8 cm) diameter and 20 in. (50·8 c.m.) high, accelerates electrons to 16 million V for an input of 80 kVA at 50 cycles. Previous American sets developed 20 million V but weighed from 3½ to 5 tons and required nearly 500 kVA at the same frequency.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bath.—29th March. City Council. Electrical supplies for twelve months from 1st June next. (5th March.)

Bedfordshire.—27th March. Education Committee. Electrical installation in temporary accommodation, North Bedfordshire College of Further Education. (12th March.)

Brierley Hill.—1st April. Urban District Council. Electrically driven vertical treble ram pump at Kinver Street pumping station, Wordsley, Stourbridge. Surveyor, Hawbush House, Brierley Hill.

Egypt.—31st March. Egyptian Government. In connection with the invitation for the supply of mechanical and electrical equipment for the Aswan Dam hydro-electric scheme, the Government announces that offers of second-hand diesel generating sets of 250 kW each will be considered. (20th February.)

Gipping.—31st March. R.D.C. Electrically driven booster pump. Surveyor, Council Offices, Needham Market, Suffolk.

North Scotland.—Hydro-Electric Board. 132-kV wood-pole transmission lines. (See this issue.)

Orders Placed

Liverpool.—Electric Power and Lighting Committee. Recommended. 33-kV switchgear, Rice Lane substation (£14,971).—Ferguson, Pailin. Two 350,000 lb per hour boiler units, with ancillary plant and pipework at Clarence Dock (approx. £1,170,000).—Babcock & Wilcox. 51,500-kW turbo-alternator set and ancillary plant at Clarence Dock (£520,941).—Metropolitan-Vickers.

London.—L.C.C. Electrical installation at Peckham Central Girls' School.—Hartley Electromotives, Ltd., Battersea. Installation at Rutland Road School, Mile End.—Ilford Electrical Co. (1945), Ltd.

Mansfield.—Corporation. Accepted. One single oil circuit breaker.—Ferguson, Pailin. One 11-kV panel for extension of switchboard at Rufford Arms substation.—Crompton Parkinson. Electric vehicle battery.—Chloride Electrical Storage Co. Two 300-kVA transformers.—Brush Electrical Engineering Co.

Stockport.—Electricity Committee. Accepted. Replating storage battery at electricity works (£6,333).—Tudor Accumulator Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aylesbury.—Three pavilions at Manor House Hospital, for Bucks C.C.; G. H. Wright, Ltd., builders, 78, New Oxford Street, W.C.1.

Bradford.—Additions (£20,000) at New Central Homes; city architect, Town Hall.

Bristol.—School, Badock site; city architect.

Bromsgrove.—Factory at Cofton Hackett for Elm Metal, Ltd., West Heath.

Cardiff.—Houses (200), Gabalfa estate; city engineer, City Hall.

Factory, Mardy Industrial estate; British Steel Constructions (Birmingham), Ltd., Smith Road, Wednesbury.

Enfield.—Factory building for Johnson & Sons Smelting Works, Ltd., Creek Works, Brimsdown; J. Sadler, architect, 78, Hatton Garden, E.C.1. Metropolitan Construction Co., Ltd., builders, 66, Queen Street, E.C.4.

Leicestershire.—Infants' school, Westfield (£42,000); county architect, Grey Friars, Leicester.

Liverpool.—School and nursery class, Stapleton Avenue, Speke, for Rev. J. McCarthy, P.P.; J. C. Prestwich & Sons, architects, Bradshawgate Chambers, Leigh.

London.—ISLINGTON.—Factory, Upper Street, for F. J. Edwards, Ltd., 359, Euston Road; C. V. Ponder, architect, 75, Mortimer Street, W.1.

Lowestoft.—New works and offices at Battery Green Road for Boston Deep Sea Fishing & Ice Co.; E. C. Allerton, architect, 43a, London Road, South Lowestoft.

Maidenhead.—Factory, Cox's Green; Vandervell Products, Ltd., Western Avenue, Park Royal, W.3.

Mansfield.—Workshops, offices, etc., Nottingham Road; G. E. Neville & Sons, Talbot Street.

Houses (50), Abbott Road; borough surveyor, Town Hall.

Middleton.—Extensions to Cromer Mill, Jubilee Road, for The Cromer Ringmill (1919), Ltd.; C. T. Taylor, Roberts & Bowman, architects, 10, Clegg Street, Oldham.

Northampton.—Extensions to Berrywood Mental Hospital; county architect, County Hall.

Factory, Dallington Fields estate; Lotus, Ltd., shoe manufacturers, 88, Regent Street, London, W.1.

New factory for Mary Channel (G.B.), Ltd., Brockhall Road, Flore.

Oldham.—Repair Works and extensions to garage, Park Road, Wellington Garage (Oldham), Ltd.; Heywood & Ogden, architects, 1, St. Peter's Street.

Reading.—Extensions to works for Eastern Press, Ltd.; Sainsbury & Chamberlain, architects, 14, Cross Street.

Salford.—Technical High School, Leaf Square, Pendleton, for E.C.; W. A. Walker, city engineer, Town Hall.

Shropshire.—Boys' modern high school, Underdale; county architect, 5, Belmont, Shrewsbury.

South Shields.—Six shops with flats; also 48 aluminium houses for T.C.; J. Scott, housing architect, Town Hall.

Canada's Electrical Imports

Small Increase in 1946

ACCORDING to the recently issued official statistics of Canada's external trade in 1946, the value of the imports of electrical apparatus into the Dominion was $47,788,000, against $43,052,000 in 1945. Noteworthy among the increases were torches, batteries and accumulators, motors, precision apparatus, and telegraph and telephone material. On the other hand there were declines in the imports of dynamos, radio valves and unspecified radio apparatus. There was little sign of increase in the United Kingdom's share of the trade.

Class	1946 $ (000)	Inc. or dec. on 1945 $ (000)
Batteries, primary	645*	+ 435
Batteries, storage	643	+ 149
From United Kingdom	36	− 37
„ *United States*	606	+ 185
Heating apparatus	777	+ 379
From United Kingdom	8	− 4
„ *United States*	768	+ 382
Dynamos and parts	2,341	− 817
From United Kingdom	207	+ 131
„ *United States*	2,013	− 1,061
„ *Switzerland*	93	+ 87
„ *Australia*	13	+ 13
Lamps, carbon filament	1*	− 2
Lamps, metal filament	598*	+ 12
Lamps, arc	145*	+ 31
Fuses, fuse plugs and cut outs	237*	− 5
Torches, flashlights, side and tail lights	1,543	+ 957
From United Kingdom	31	+ 21
„ *United States*	1,490	+ 918
„ *Holland*	12	+ 12
Lighting fixtures and appliances	3,273	+ 1,534
From United Kingdom	13	− 5
„ *United States*	3.233	+ 1,513
„ *Italy*	13	+ 13
Electric meters	582	+ 38
From United Kingdom	34	− 21
„ *United States*	549	+ 60
Motors valued at less than $10	157	+ 95
From United Kingdom	6	+ 6
„ *United States*	149	+ 87
Motors and complete parts, other	4,463	+ 732
From United Kingdom	465	+ 334
„ *United States*	3,984	+ 390
„ *Sweden*	11	+ 6
„ *Switzerland*	3	+ 2
Elec. instruments and apparatus of precision of a kind not made in Canada	947	+ 357
From United Kingdom	51	+ 2
„ *United States*	895	+ 355
Rheostats, controllers, etc.	3,183	+ 1,245
From United Kingdom	26	+ 4
„ *United States*	3,142	+ 1,238
„ *Switzerland*	15	+ 3
Self-contained lighting outfits	419*	− 82
Electric irons	286	+ 220
From United Kingdom	16	+ 16
„ *United States*	270	+ 204
Sockets, outlets, etc.	329*	+ 24
Magnetos and parts for i.c. engine manufacturers	55*	+ 17
Spark plugs, magnetos, etc.	76*	+ 32
Flameproof switchgear for use underground in coal mines (all from United Kingdom)	10	+ 6
Switches, switchboards and circuit breakers	2,210	+ 56
From United Kingdom	92	− 3
„ *United States*	2,093	+ 64
„ *Switzerland*	25	− 5
Telegraph apparatus	621	+ 281
From United Kingdom	54	− 18
„ *United States*	568	+ 264
Radio receiving sets	803*	+ 296
Radio set parts	2,477*	+ 1,352
Radio valve parts	644*	− 758
Other radio apparatus, n.o.p.	5,712	− 4,414
From United Kingdom	315	− 1,144
„ *United States*	5,384	− 3,283
Radio valves	1,165*	− 1,309
Telephone apparatus	3,490	+ 1,362
From United Kingdom	173	+ 131
„ *United States*	3,316	+ 1,230
Transformers and complete parts	641	+ 247
From United Kingdom	114	+ 85
„ *United States*	526	+ 164
Electric steam generators of a kind not made in Canada, and parts	547	+ 112
From United Kingdom	298	+ 278
„ *United States*	175	− 239
Electric dry shavers	497*	+ 371
Electrical apparatus, n.o.p.	5,719	+ 1,104
From United Kingdom	171	+ 7
„ *United States*	5,543	+ 1,105
„ *Switzerland*	4	− 6

*All or nearly all from U.S.A.

Canadian Power Production

Output of central electric stations in Canada was 44,986 million kWh in 1947, an increase of 8 per cent. Consumption of primary power in 1947 totalled 37,322 million kWh (compared with 31,063 million). 2,120 million kWh (2,481 million) was exported to the United States.